CORRES CONTROL
LTR. NO
K-H Corres #

Originator Ltr Log #
SLG-001-97
97 - RF -

DIST	LTR	ENC
BARTHEL, J M		
BENGEL, P R		
BENSON, C.A.		
CARMEAN C H		
DAWSON, D		
EDWARDS, J D		
FINDLEY, M E.		
FITZ, R C		
GUINN, L.A.		
HUGHES, F.P		
McANALLY J L		
POWER, A.P		
REED, A.B		
TYSON A.M.		
WAGNER, M.J		
WHEELER M		
Broussard, M	X	
Griffin, B	X	X
Lobdell, D	X	
Salomon, H	X	X
Valenguela, J	X	X
RMRS RECORDS	X	X
RF CORRES CONTROL		
TRAFFIC		
PATS/T130G		

CLASSIFICATION		
UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE

Date 6-26-97
IN REPLY TO RF CC NO

ACTION ITEM STATUS
☐ PARTIAL/OPEN
☐ CLOSED

LTR APPROVALS
MCB/MCB
ORIG & TYPIST INITIALS
HS:aw
RF-46469(Rev 1/97)

RMRS Rocky Mountain Remediation Services, L.L.C
protecting the environment
ky Flats Environmental Technology Site
Box 464
len Colorado 80402-0464
ne (303) 966 7000

June 26, 1997

John Harris
Laurie Beitel
Andrew Jacobs
Lockheed Martin Idaho Technologies Co
P O Box 1625
Idaho Falls, ID 83415-2424

Subject TRANSMITTAL OF WASTE PROFILES FOR GRANULAR ACTIVATED CARBO
FROM ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE - SLG-001-97

Attached please find for review the waste profile for the spent granular activated carbon (GAC) that we have been discussing as a possible candidate for incineration at WERF The Waste Profile includes an executive summary, INEEL L-0435 10 - L0435-12 forms, and various attachments supporting the waste profile The Generator Certifier Signature on form L-0435 12 has not yet been signed by Rocky Flats Waste Certification Organization personnel In the interest of completing the review and approval process to support a late July update of the INEEL Site Treatment Plan, we are sending the waste profiles in draft form, awaiting final waste certification approval by the Rocky Flats Waste Certification Organization

As was discussed in our June 18, 1997 meeting, we will be working to complete the INEEL L-0435 14 - L-0435 17 forms by August 9, 1997 to support the shipment to INEEL if the waste stream is approved In addition, our Waste Management Organization continues to make progress toward the completion of the waste profiles for various non-hazardous, low level radioactive waste oils at RFETS Incineration of these waste oils in substitution for new will be a significant waste minimization success if achieved

We look forward to working with you to complete the treatment of this waste If you have any questions please call me at (303) 966-6588 or Hopi Salomon at (303) 966-6627

Shaun L Garner
Project Manager

HS/aw

EXECUTIVE SUMMARY WASTE PROFILE FOR GRANULATED ACTIVATED CARBON A SUBSET OF PARTICULATE SLUDGE (RF-W071)

Rocky Flats Environmental Technology Site (RFETS) has generated a granulated activated carbon mixed waste stream from several environmental restoration projects This waste stream is identified as a subset of Particulate Sludge, Site Treatment Plan number RF-W071 The RFETS Site Treatment Plan, Rebaseline, identifies catalytic chemical oxidation (a process that is currently being de-funded) as the primary treatment option for this waste This profile is being submitted to INEEL for review and potential approval for processing at the WERF incinerator, as a new, contingency treatment option

ANALYTICAL INFORMATION/PROCESS KNOWLEDGE

This material has been determined to be a mixed waste based on sample results and process knowledge The waste stream consists of granulated activated carbon (GAC) The GAC originated from several Environmental Restoration based sources The GAC was used to polish the airstream from low temperature thermal desorption units (TDUs), which were used in processing radioactive soils and debris contaminated with VOCs Other GAC originated at the Consolidated Water Treatment Facility (CWTF) where it was used as a final organic polishing step on treated wastewater originally generated from various ER activities including condensate from the TDUs described above

Some of the soil and drums originally treated in the TDUs contained VOCs from listed sources (F001 and F002 - Ryan's Pit Project) Treatment residuals (e g , GAC) would therefore be considered hazardous via the RCRA derived from rule In addition, some of the treated soil and drums contained VOCs that did not originate from listed sources (Trenches T-3 and T-4 Project) and were evaluated with respect to their RCRA characteristics Samples from this GAC exceeded select RCRA TCLP standards (TCE and mercury), and contained slightly elevated levels of uranium, plutonium and americium isotopes As a result, the spent GAC is classified as mixed waste Because the GAC greatly exceeds LDR treatment standards for various VOCs (e g , the PCE LDR level is 6 ppm, a sample of the waste was 7,400 ppm), the waste must be treated prior to disposal The waste codes that apply to this waste are F001 and F002 (for the spent solvents TCE, PCE and 1,1,1-Trichloroethane from the Ryan's Pit Project) and D040 (TCE) and D009 (mercury) from the Trenches T-3 and T-4 Project Listed and characteristic waste codes apply for TCE because the GAC contains TCE from both types of sources

Other VOCs such as Benzene and Toluene were detected in the GAC These constituents can be associated with RCRA listed hazardous waste codes (e g , F005) However, these contaminants are suspected to have originated as components of gasoline, and not a solvent process Therefore, the GAC does not carry listed codes for these types of constituents Since mercury is a volatile metal, it was sorbed onto the GAC in the same manner as the VOCs during the TDU treatment

Process knowledge and full suite TCLP results indicate that no other hazardous waste codes apply to this waste stream A draft Land Disposal Notification and Certification Form is included with this submittal as Attachment 1 Because the GAC came from multiple sources, some of which were not listed or did not exceed a TCLP limit, not all waste codes associated with this profile are on all GAC waste containers Attachment 2 contains a table which ties waste origination to waste codes, individual waste containers and corresponding sample numbers

GENERAL CHARACTERIZATION APPROACH

Samples collected in support of this waste profile were collected to represent highest concentrations of contaminants from each of the two GAC sources (the TDU's and the CWTF) Waste removed from the TDUs carbon units were placed into ten, 55 gallon drums and four, 4' x 4' x 7' wooden waste crates GAC contained in drum D87122 came from one of three parallel carbon units that was used in processing a greater volume of soil and debris than any other carbon unit This drum was sampled three times to complete the waste profile (samples DB00012RM, DB00015RM, DB00038RM)

Samples of GAC from the CWTF originated from GAC that was removed from the top of the influent side of the GAC unit This GAC would contain the highest levels of absorbed contaminants Samples of the CWTF GAC are FT20601RG, FT20604RG, and DB00039RM Attachment 3 contains a summary table of the GAC analytical results, the Form 1 Analytical Results and the log sheets and chain of custody forms used in the sample collection process

Exceptions to the INEEL RRWAC

RRWAC, Section 4.6.2.1

Currently RF-W071 has not received treatment approval via the INEEL-Site Treatment Plan (STP) and is therefore not recognized by the Waste Analysis Plan

RRWAC, Section 4.6.2.9

GAC is packaged as follows

thirty - 55 gallon drums with 2 plastic liners
four - 4' x 4' x 7' wooden waste crates with 1 cardboard liner, and one plastic inner liner

L-0435 Waste Profile Information

L-0435.10: Generators Certification and Information

Item (6) Rate of Generation

The rate of generation is listed as ongoing at a 775 5 ft^3/yr This section also lists the mass at 24156 lbs The GAC generation rate of 775 5 ft^3/yr represents the volume of GAC generated from a number of projects completed in approximately one year It is anticipated that this waste stream will be generated from similar projects in the future at relatively like rates Future projects will generate GAC with the same or similar waste codes, suites of contaminants, and at contaminant levels consistent with what is represented by this L-0435 form As necessary, modifications to the L-0435's or other supporting documentation will be completed to represent future GAC waste streams Attachment 4 gives the calculations and assumptions used at arriving the stated rate

L-0435.11: Characterization of Material

Item (2)(d)(1) Heat of Combustion and item (2)(d)(2) Ash Content

Ash content and BTU content are listed as

Ash Content 5-10%
Heat of Combustion 5,000 - 10,000 BTU/lb

These estimates were given by Jim Sherbondy, Technical Representative for TIGG Corporation (412) 257-8520, an original supplier of the GAC in a telephone conversation with H Salomon at Rocky Flats (303) 966-6627, on March 31, 1997

Item (2)(d)(3) Total Halogen Content

Total halogen content is listed as <15 to 8,479 ppm

The only halogens present in this GAC are expected to be from the chlorinated volatile organic compounds for which samples have been collected and analyzed These samples evaluated total VOCs in the waste stream Using these results and the molecular weights of the chlorinated compounds detected, the concentration of the chlorine (the only halogen expected) can be calculated A copy of the spread sheet used to calculate the chlorine from the total VOC results is included as Attachment 5 These results represent the maximum expected chlorine (halogen) concentration from a biased grab sample (sample # DB00015RMDL)

L-0435.12: Radiological Characteristics of Material

Item (1) Other Isotopes Present

Analytical results used for the quantitation of some isotopes in the GAC are reported as a combination of the isotopes (e g , Uranium-233/234) Analytical results themselves do not allow for the identification of the specific isotope In the case of Uranium-233/234 all results reported are attributable to the isotope Uranium-234, and are listed this way in section (1) of the L-0435 12 form Operations requiring the generation, storage or use of Uranium-233 have not been performed at RFETS Information regarding the use and storage of this isotope in the DOE system can be found in *Uranium-233 Storage Safety At Department of Energy Facilities*, Defense Nuclear Facilities Safety Board Technical Report, DNFSB/TECH-13, February, 1997

Daughter Products were calculated using the computer software *Raddecay Programming and File Structure Information*, Grove Engineering, Inc , October, 1987 Only isotopes calculated to exceed the Section 4 6 2(7) RRWAC criteria of 0 1 pCi/g for alpha or beta emitters or 1 pCi/g for gamma emitters are listed on the form The isotopes calculated to exceed this criteria are thorium-231 which is in equilibrium with uranium-235, thorium-234 and protactinium-234m which are both in equilibrium with uranium-238 A thirty three year age was assumed as the initial generation of the isotopes, which corresponds to the opening of the first burial trench of which the GAC is a treatment residue from

Supporting Information Used to Complete the Waste Profile

Attachment No.	Description
1	LDR Notification and Certification Form - Including UTS
2	Table Tying Waste Origination to Waste Codes,Waste Containers and Corresponding Sample Numbers
3	Analytical Summary Tables, Analytical Data (Form 1's), Log Sheets, and Chain of Custody Forms
4	Assumptions Used for the Calculation of Volume, Mass and Rate of GAC Generation
5	Calculation of Maximum Chlorine (Halogen) Concentration
6	MSDSs for Granulated Activated Carbon and Radsorb
7	RFETS Waste Packaging Variance Request and Industrial Hygiene VOC Monitoring Results

MATERIAL AND WASTE CHARACTERIZATION
GENERATOR'S CERTIFICATION AND INFORMATION

FORM L-0435 10#
(07-96 - Rev #00)

Receiving Organization Use Only

Approved by Signature _____ Printed Name _____

_____ RWMC _____ WROC _____ TAN _____ Pollution Prevention _____ ICPP

Characterization ID No _____ Content Code(s) _____ Date _____

A Generator's Certification

I certify that the information on this form L-0669# and attachments is true and accurate I have put forth a good faith effort to acquire and verify the information used to complete this characterization Willful and deliberate omissions have not been made All known and suspected hazards have to the best of my knowledge been disclosed

Generator Certifier Signature	Printed Name	Title	June 26, 1997 Date

Phone _____ Mailstop _____ Facsimile No _____ E-Mail ID shaun garner@rfets gov

Generating Facility Rocky Flats Environmental Technol Site Building T-3/T-4, Ryans Pit, Building 891 Organization Environmental Restoration Projects

B General Information

1 __x__ Yes _____ No Will material and waste characterization be fully capable of complying with applicable RRWAC Subsection?

If "No", receiving organization approval and completion of the following is required

a. INEL-RRWAC requirement(s) not met (list each) _____

b Receiving organization approval letter number for nonstandard material or waste _____

	Contact	Name	E-Mail ID	Phone	Pager	Mail Stop	Charge Number
2	Generator	Mike Pepping		(303) 966-3075	966-4000 (7464)	T893B	NA
3	Technical	Hopi Salomon	hopi salomon@rfets gov	(303) 966-6627	966-4000 (5129)	T893B	NA

4 Material or Waste Type and action 4 6 2 mixed LLW to be incinerated at the WERF

5 Common Name of Material Spent Granualted Activated Carbon (GAC)

6 Rate of Generation _____One Time Only Liquid _____gal Solid _____lb or _____ft^3 _____m^3

__x__On-going Liquid _____gal/yr Solid 24156 lb or 775 5 ft^3/yr _____m^3/yr

7 Generating Process Description • This GAC was used to polish an airstream from a low-temperature thermal desorption unit used to treat VOC contaminated soil and debris, and from a CERCLA wastewater treatment unit (Building 891) where it was used as a final polishing step during processing of water from ER activities

8 Physical State at 70°F (solid, liquid, sludge, gel, etc) solid

9 _____Yes __x__No Does material contain free liquids?

10 _____Yes _____No Current Waste Minimization Plan (INEL Generators Only)

11 Indicate all that apply __x__CERCLA ___Scrap Metal __x__OSHA Carcinogen ___PCB ≥ 50 ppm ___Etiologic Agent

___Nonfriable Asbestos ___FIFRA ___Unused Material ___Used Oil ___Aerosol Cans ___Compressed Gas Cylinders

___Friable Asbestos ___Soil ___Debris ___Spill Cleanup ___Wastewater ___Classified Material

__x__ > 100 PPM VOCs ___Accountable Nuclear Material

12 __x__Yes _____No Is this DOT regulated hazardous material? If yes identify DOT primary hazard Class 9, Hazardous Waste Solid and DOT subsidiary none

13 __x__Yes _____No At the point of generation did this material contain any RCRA F" K , U" or P' listed waste in pure form as a mixture or as a treatment residue (i e , ash, leachate, spill cleanup) or "D" characteristic waste? If yes give applicable EPA Hazardous Waste Numbers and attach applicable LDR notification and certification (40 CFR 261) F001 F002 D040 D009 _____ _____ _____ _____

_____ _____ _____ _____ _____ _____ _____ _____

• Indicate when a continuation sheet is used

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Idaho National Engineering Laboratory

MATERIAL AND WASTE CHARACTERIZATION
GENERATOR'S CERTIFICATION AND INFORMATION

FORM L-0435 10#
(07-96 - Rev #00)

14 RCRA hazardous waste determination was made by __x__ Waste Analysis and/or __x__ process knowledge Include appropriate information as required by the GI

15 For mixed waste if Characterization ID No is different than the INEL Site Treatment Plan Waste Stream (STP) ID No the STP ID No is RF-W071-GAC

16 __x__Yes _____No Is Section C1, Physical Characteristics of Material, required by the GI? If yes, complete Section C1

17 __x__Yes _____No Is Section C2, Chemical Characteristics of Material required? If yes complete Section C2

18 __x__Yes _____No Does the GI require radiological characterization? If yes complete Section C3 Radiological Characteristics of Material, per GI instructions

19 _____Yes __x__No Is this a lab pack? If yes, complete Item D, Lab Pack Inventory List

20 _____Yes __x__No Does the GI require any additional information? If yes, see instructions

21 __x__Yes _____No Is determination of Underlying Hazardous Constituents required?

22 __x__Yes _____No Is supporting documentation submitted? Is yes list 1) LDR Notification and Certification Form, 2) Table Tying Waste Origination to Waste Codes, Waste Containers, and Corresponding Sample Numbers, 3) Analytical Summary Tables, Analytical Data (Form 1's), Log Sheets, and COC forms, 4) Assumptions Used for Calculation of Volume, Mass and Rate of GAC Generation, 5) Calculation of Maximum Chlorine (Halogen) Concentration, 6) MSDSs for GAC and RADSORB, 7) RFETS Waste Packaging Variance Request and Industrial Hygiene VOC Monitoring Results (performed in accordance with 40 CFR Part 60, Appendix A, Method 21)

FORM L-0435 11#
(07-96 - Rev #00)

MATERIAL AND WASTE CHARACTERIZATION
CHARACTERIZATION OF MATERIAL

Characterization Identification No _____

C Characterization of Material

1 Physical Characteristics of Material

a. General characteristics (number from top to bottom For nonlayered No 1 is 100%)

Layer No	Physical state at 70°F	Range of Percentage of Total			Color (as required by GI)
1	solid	98	to	100	black,granular material (GAC)
2	solid	0	to	2	white, fine granular material (RADSORB - absorbent)
3			to		
4			to		
5			to		

b x Yes ___ No Is density required? If yes, give density range of representative sample

Liquid _____ to _____ g/mL Solid 0 25 to 0 6 g/cc

c ___ Yes x No Is this aqueous waste to be processed in the PWTU? If yes give total solids range for representative sample _____ to _____ g/mL

d ___ Yes x No Is this WERF incinerable liquid? If yes give viscosity _____ to _____ SSU

2 Chemical Characteristics of Material

a. Does the material contain any of the following? For each item (1)-(14) checked yes, must include corresponding quantitative information in C2b with the corresponding number (1)-(14) from this list.

YES	NO		YES	NO	
	x	(1) Organic free liquid	**For liquid waste only**		
	x	Aqueous free liquid			Nickel and/or its compounds (as Ni) ≥ 134 mg/L
		If yes, give pH range _____ to _____			Thallium and/or its compounds (as Tl) ≥ 103 mg/L
x		(2) Absorbents			Halogenated organic compounds ≥ 1000 mg/L
	x	(3) Chelating agents			as listed in 40 CFR 268, Appendix III
	x	(4) Aqueous liquid with reactive cyanide ≥ 250 ppm	**For solid waste only**		
	x	(5) Aqueous liquid with reactive sulfide ≥ 500 ppm	x		Halogenated organic compounds ≥ 1000 mg/kg as
	x	(6) Air reactive			listed in 40 CFR 268 Appendix III
	x	(7) Water reactive	**For used oil only**		
	x	(8) Other reactive			Arsenic ≥ 5 ppm
	x	(9) Fuming acids or acid gases			Cadmium ≥ 2 ppm
	x	(10) Shock sensitive constituents			Chromium ≥ 10 ppm
	x	(11) Explosives			Lead ≥ 100 ppm
	x	(12) Pyrophories			PCBs ≥ 2 ppm
	x	(13) Petroleum products			Total halogens ≥ 4 000 ppm
	x	(14) Oxidizers			Total halogens ≥ 1 000 ppm
x		Benzene	**For fluid to be processed in the PWTU only**		
	x	PCBs ≥ 25 ppm			Oil and grease ≥ 10 mg/L
	x	PCBs ≥ 5 ppm			

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MATERIAL AND WASTE CHARACTERIZATION
CHARACTERIZATION OF MATERIAL

FORM L-0435 11#
(07-96 - Rev #00)

Characterization Identification No _____

C Characterization of Material

2 Continued

2a Continued

YES	NO		YES	NO	
					For WERF incinerable wastes only
	x	PCB liquids	x		Chlorine in any form
	x	PCB capacitors/ballasts		x	Bromine in any form
	x	PCB transformers/regulators		x	Iodine in any form
		If yes, check the following as applicable		x	Flourine in any form
		___Full ___Drained Only ___Drained and flushed	x		Sulfur in any form
	x	Is the material PCB-liquid-contaminated debris or derived from a spill of PCB liquid? If yes, give range or original PCB concentration _____ to _____ ppm		x	PCBs ≥ 2 ppm

b Chemical Characteristics of Material For all the items checked in 2a, enter the common name as indicated and quantitative data as required Also enter the number, i e , (1-14) as checked in 2a , when appropriate

Composition (as required by GI)

Name of Material or Chemical	2a Item No	OSHA Carcinogen?	FIFRA Regulated?	Composition Range ___ weight % or x ppm
Absorbent (RADSORB)	(2)	___Yes x No	___Yes x No	2,000 to 20,000
Benzene		x Yes ___No	___Yes x No	<0 6 to 270
Halogenated organic compounds >1000 mg/kg		___Yes ___No	___Yes ___No	_____ to _____
Tetrachloroethene (perchloroethene, PCE)		___Yes x No	___Yes x No	12 to 7,400
Trichloroethene (TCE)		___Yes x No	___Yes x No	0 83 to 2,300
Sulfur in any form (total sulfur)		___Yes x No	___Yes x No	0 945 to 7 7

Continuation sheet included? ___Yes x No

c ___Yes x No Is flash point required? If yes complete the following

Flash point is _____ to _____ °F (400 to 400 °C) Method used ___ Open Cup ___ Closed Cup x Other (specify) flash point data gathered from MSDS - ASTM method (for dry, virgin state - however, not tested on this spent GAC)

d Information for WERF incinerable waste only

(1) Heat of combustion 5,000 to 10,000 Btu/lb (2) Ash content 5 to 10 %

(3) Total halogen content <15 to 8,479 ppm (4) Water content _____ to _____ %

(5) Suspended particulate content _____ to _____ ppm

e x Yes ___No Is RCRA Waste analysis required? If yes enter data below as applicable

x Yes ___No Were the sampling and analysis protocols used in full compliance with SW-846 protocol or other equivalent regulatory agency approved methods? If no, explain in Section B Items 20 and 22

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MATERIAL AND WASTE CHARACTERIZATION
CHARACTERIZATION OF MATERIAL

FORM L-0435 11#
(07-96 - Rev #00)

Characterization Identification No _____

C. Characterization of Material

2 f Analyte Data.

	Analyte	Underlying Hazardous Constituent? (Y/N)	Type of Analysis Indicate Total	Type of Analysis Indicate TCLP	Expected Concentration Range ___mg/kg or ___ mg/L	Representative Sample Analysis _x_mg/kg or ___ mg/L	Detection Limit ___mg/kg or ___ mg/L
1	tetrachlorethene	y	x		to	7,400	
2	trichloroethene	y	x		to	2,300	
3	1,2 Dichloropropane	y	x		to	280	
4	benzene	y	x		to	270	
5	toluene	y	x		to	190	
6	carbon tetrachloride	y	x		to	170	
7	1,1,1-trichloroethane	y	x		to	120	
8	chloroform	y	x		to	78	
9	xylene (total)	y	x		to	70	
10	ethylbenzene	y	x		to	56 (J)	
11	4-methyl-2-pentanone	y	x		to	38 (J)	
12	MEK (2-Butanone)	y	x		to	0 54 - 110 (J)	
13	styrene	n	x		to	16 (J)	
14	pyridine	y		x	to	0 7 (E) mg/L	
15	mercury	y		x	to	0 0033-0 617 mg/L	
16	mercury	y	x		to	2 5-41 3	
17	copper	n	x		to	19 4 - 51,348 4	
18					to		
19					to		
20					to		
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37					to		

INEL
Idaho National Engineering Laboratory

FORM L-0435 12#
(07-96 - Rev #00)

MATERIAL AND WASTE CHARACTERIZATION
RADIOLOGICAL CHARACTERISTICS OF MATERIAL

Characterization Identification No _____

C Characterization of Material

3 Radiological Characteristics of Material

a For MLLW and MTRU give (check one) ____Known or __x__Estimated date of initial generation at or before October 1964

b ____Yes __x__No Is waste treatment plan for MLLW on file with INEL MLLW coordinator?

c ____Yes __x__No Is fissile material present? If yes waste matrix group _____ (RWMC Acceptance Only)

d __x__Yes ____No Are transuranic isotopes present ? If yes complete items 3e 3f and 3h

e Total activity per gram of waste of alpha emitting transuranic isotopes with half-lifes greater than 20 years

__x__Yes ____No ≤ 10 nCi/g (LLW) or

____Yes __x__No > 10 nCi/g and ≤ 100 nCi/g, (SCW) or

____Yes __x__No > 100 nCi/g (TRU)

f Transuranic isotope inventory

Isotope	Activity Range Units (pCi/g)			Fissionable Material Range g / kg			Representative Sample Analysis Activity (nCi/g)	Representative Sample Analysis Fissionable Material g / kg
Pu-239/240	0 013+/- 0 005	to	0 376+/- 0 034	N A	to	N A		
Am-241	0 004+/- 0 004	to	0 382+/- 0 050	N A	to	N A		
		to			to			
		to			to			
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		to			to			
Summation	0 017	to	0 758		to			

g __x__Yes ____No Is U-233 or U-235 present? If yes complete data below and item 3h

Isotope	Activity Range Units (pCi/g)			Fissionable Material Range g / kg			Representative Sample Analysis Activity (Ci/g)	Representative Sample Analysis Fissionable Material g / kg
U-233		to			to			
	enriched to ____%							
U-235	0 013+/- 0 013	to	0 240+/- 0 032	N A	to	N A		
	enriched to 0 %							

h Fissionable material range summation N A to N A (grams)

INEL

Idaho National Engineering Laboratory

FORM L-0435 12#
(07-96 - Rev #00)

MATERIAL AND WASTE CHARACTERIZATION
RADIOLOGICAL CHARACTERISTICS OF MATERIAL

Characterization Identification No _____

C Characterization of Material

i __x__ Yes _____ No Are other isotopes present? If yes, complete data below

Isotope	Activity Range Units (pCi/g)			Activity Representative Sample Analysis Units	Isotope	Activity Range Units			Activity Representative Sample Analysis Units
U-234	0 037+/- 0 032	to	7 21+/- 0 27				to		
U-238	0 2+/-0 066	to	9 88+/- 36				to		
Th-231	0 013+/- 0 03	to	0 240+/- 0 032				to		
Th-234	0 2+/-0 066	to	9 88+/- 36				to		
Pa-234m	0 2+/-0 066	to	9 88+/- 36				to		
		to					to		
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j Nuclear thermal power range NA to _____ watts/ft³

k Expected radiation dose rate at surface <0 5 to <0 5 mrem/h and 1 meter <0 5 to <0 5 mrem/h

l _____ Yes __x__ No Is the waste special case waste? Include determination documentation

m _____ Yes __x__ No Is the waste greater than class C as defined in 10 CFR 61 55?

Attachment 1

LDR Notification and Certification Form - Including UTS

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM (UTS)

Generator Name U.S. Dept. of Energy/ Rocky Flats ETS Manifest Doc No

CWM Profile Number R F - W 0 7 1 (Spent Granulated Activated Carbon) State Manifest No N.A.

1 Is this waste a non wastewater or a wastewater? (See 40 CFR 268 2) Check ONE Non-Wastewater ☒ Wastewater ☐

2 If this waste is subject to any California List restrictions enter the letter from below (either A B1 or B2) next to each restriction that is applicable
_____ HOCs _____ PCBs _____ Metals _____ Acid _____ Cyanides (Removed from regulation per 62FR 26005)

3 Identify ALL US EPA hazardous waste codes that apply to this waste shipment as defined by 40 CFR 261 For each waste code identify the corresponding subcategory or check NONE if the waste code has no subcategory Spent solvent and California List treatment standards are listed on the back of this form If F039 multi source leachate applies those constituents must be listed and attached by the generator If D001 D002 or D012 D043 requires treatment of the characteristic and meet 268 48 standards then the underlying hazardous constituent(s) present in the waste must be listed and attached

REF #	4 US EPA HAZARDOUS WASTE CODE(S)	5 SUBCATEGORY ENTER THE SUBCATEGORY DESCRIPTION IF NOT APPLICABLE SIMPLY CHECK NONE		6 HOW MUST THE WASTE BE MANAGED? ENTER THE LETTER FROM BELOW
		DESCRIPTION	NONE	
1	F001		X	A
2	F002		X	A
3	D040		X	A
4	D009	(Low Mercury Subcategory)		A
5				
6				
7				
8				
9				
10				

To identify F039 or D001 D002 D012 D043 underlying hazardous constituent(s) use the F039/Underlying Hazardous Constituent Form" provided (CWM 2004) and check here ☒
If no-UHCs are present in the waste upon its initial generation check here ☐
To list additional US EPA waste code(s) and subcategone(s) use the supplemental sheet provided (CWM 2005-B) and check here ☐

HOW MUST THE WASTE BE MANAGED? In column 7 above enter the letter (A B1 B2 B3 C D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268 7) Please understand that if you enter the letter B1 B2 B3 or D you are making the appropriate certification as provided below

A RESTRICTED WASTE REQUIRES TREATMENT

This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D 268 32 or RCRA Section 3004(d)
☐ For Hazardous Debris "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268 45 "

B 1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that based on my inquiry of those individuals immediately responsible for obtaining this information I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268 32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste I am aware that there are significant penalties for submitting a false certification including the possibility of fine and imprisonment "

B 2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268 42 I am aware that there are significant penalties for submitting a false certification including the possibility of fine and imprisonment "

B 3 GOOD FAITH ANALYTICAL CERTIFICATION - FOR INCINERATED ORGANICS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that based on my inquiry of those individuals immediately responsible for obtaining this information I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or 40 CFR Part 265 Subpart O or by combustion in fuel substitution units operating in accordance with applicable technical requirements and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents I am aware that there are significant penalties for submitting a false certification including the possibility of fine and imprisonment "

C RESTRICTED WASTE SUBJECT TO A VARIANCE

This waste is subject to a national capacity variance a treatability variance or a case by-case extension Enter the effective date of prohibition in column 7 above
☐ For Hazardous Debris "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268 45 "

D RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT

"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D and all applicable prohibition levels set forth in Section 268 32 or RCRA Section 3004(d) and therefore can be land disposed without further treatment A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment storage and disposal facility named above I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268 32 or RCRA section 3004(d) I believe that the information I submitted is true accurate and complete I am aware that there are significant penalties for submitting false certification including the possibility of a fine and imprisonment "

E WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS

This waste is a newly identified waste that is not currently subject to any 40 CFR 268 restrictions

I hereby certify that all information submitted in this and all associated documents is complete and accurate to the best of my knowledge and information

Signature [signature] Title PROJECT MANAGER Date 6-24-97

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM - REVERSE SIDE

SOLVENT AND CALIFORNIA LIST TREATMENT STANDARDS

If the waste identified on the other side of this form is described by any of the following US EPA hazardous waste codes F001 F002 F003 F004 F005 and all solvent constituents will not be monitored by the treater and/or this hazardous waste is subject to any prohibitions identified as California List restrictions (40 CFR 268 32 and/or RCRA Section 3004(d)) then each constituent MUST be identified below by checking the appropriate box and this page must accompany the shipment along with the opposite side of this form If the waste code F039 describes this waste then the corresponding list of constituents must be attached If D001 D002, or D012 D043 require treatment to 268 48 standards then the underlying hazardous constituent(s) must also be attached

SOLVENT WASTE TREATMENT STANDARDS

✓	F001 through F005 spent solvent constituents and their associated US EPA hazardous waste code(s)	Treatment Standard[1]		✓	F001 through F005 spent solvent constituents and their associated US EPA hazardous waste code(s)	Treatment Standard[1]	
		Wastewaters	Nonwastewaters			Wastewaters	Nonwastewaters
	Acetone (F003)	0 28	160		Methylene chloride (F001 F002)	0 089	30
	Benzene (F005)	0 14	10		Methyl ethyl ketone (F005)	0 28	36
	n Butyl alcohol (F003)	5 6	2 6		Methyl isobutyl ketone (F003)	0 14	33
	Carbon disulfide (F005)	3 8	4 8 TCLP		Nitrobenzene (F004)	0 068	14
	Carbon tetrachloride (F001)	0 057	6 0		2 Nitropropane (F005)	[(WETOX or CHOXD) followed by CARBN] OR INCIN	INCIN
	Chlorobenzene (F002)	0 057	6 0				
	O Cresol (F004)	0 11	5 6		Pyridine (F005)	0 014	16
	Cresols (m and p isomers) (F004)	0 77	5 6	X	Tetrachloroethylene (F001 F002)	0 056	6 0
	Cyclohexanone (F003)	0 36	0 75 TCLP		Toluene (F005)	0 08	10
	o Dichlorobenzene (F002)	0 088	6 0	X	1 1 1 Trichloroethane (F001 F002)	0 054	6 0
	2-Ethoxyethanol (F005) (also called ethylene glycol monethyl ether)	INCIN or BIODG	INCIN		1 1 2 Trichloroethane (F002)	0 054	6 0
					1 1 2 Trichloro 1 2 2 trifluoroethane (F002)	0 057	30
	Ethyl acetate (F003)	0 34	33				
	Ethyl benzene (F003)	0 057	10	X	Trichloroethylene (F001 F002)	0 054	6 0
	Ethyl ether (F003)	0 12	160		Trichloromonofluoromethane (F002)	0 02	30
	Isobutanol (F005)	5 6	170		Xylenes (F003) (sum of o p- and m isomers)	0 32	30
	Methanol (F003)	5 6	0 75 TCLP				

1 All spent solvent treatment standards are measured through a total waste analysis (TCA) unless otherwise noted Wastewater units are mg/l nonwastewater are mg/kg

CALIFORNIA LIST TREATMENT STANDARDS – 40 CFR 268 32, 40 CFR 268 42 and RCRA Section 3004(d)
A waste must first be designated as a US EPA Hazardous waste before the waste can be subject to the California List restrictions

Restricted waste description	Prohibition	Treatment Standard
Liquid or nonliquid wastes containing Halogenated Organic Compounds listed in 40 CFR 268 Appendix III	Liquid wastes Greater than or equal to 1 000 mg/l Nonliquid wastes Greater than or equal to 1 000 mg/kg	40 CFR 268 42(a)(2) – INCIN or FSUBS
Liquid wastes containing PolyChlorinated Biphenyls (PCBs)	Greater than or equal to 50 ppm	40 CFR 268 42(a)(1) – INCIN or FSUBS Also see 40 CFR 761 60 and 70
Liquid* wastes containing Metals Note Hazardous wastes containing As Cd Cr Hg Pb or Se must also be evaluated if not characteristically hazardous for that metal	One or more of the following metals (or elements) at a concentration greater than or equal to the following Nickel and/or compounds as Ni 134 mg/l Thallium and/or compounds as Th 130 mg/l	RCRA Section 3004(d)

CWM 2005A (12/94)

For the definition of "liquid" refer to Method 9095 the Paint Filter Liquids Test from EPA manual SW-846

SUBCATEGORY REFERENCE

D001
A. Ignitable characteristic wastes except for the 40 CFR 261 21(a)(1) High TOC subcategory that are managed in non CWA/non-CWA-equivalent/non Class I SDWA systems
B Ignitable characteristic wastes except for the 40 CFR 261 21(a)(1) High TOC subcategory that are managed in CWA CWA-equivalent or Class I SDWA systems
C High TOC ignitable characteristic liquids subcategory based on 40 CFR 261 21(a)(1) Greater than or equal to 10% total organic carbon
D002.
D Corrosive characteristic wastes that are managed in non-CWA/non CWA-equivalent/non Class I SDWA systems
E Corrosive characteristic wastes that are managed in CWA CWA equivalent or Class I SDWA systems

UNDERLYING HAZARDOUS CONSTITUENT FORM (UTS)

Generator Name: U.S. Dept. of Energy/Rocky Flats ETS Manifest Doc. No.: _____

Waste ID No.: RF-W071 (Spent Granulated Activated Carbon) State Manifest No.: N.A.

If D001, D002, D003, or D012-D043 requires treatment to 268.48 standards, then each underlying hazardous constituent present in the waste at the point of generation, and at a level above the UTS constituent specific treatment standard, must be listed. Write the letter [A, B1, B3, or C which corresponds to the letter on the Land Disposal Notification and Certification Form (UTS)] beside each constituent present to properly describe how the constituent(s) must be managed under 40 CFR 268 7.

CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)	CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)
ORGANIC				Carbosulfan		0 028	1 4
A2213		0.003	1.4	Chlordane (alpha and gamma isomers)		0.0033	0.26
Acenaphthene		0.059	3.4	p-Chloroaniline		0 46	16
Acenaphthylene		0 059	3 4	Chlorobenzene		0.057	6 0
Acetone		0.28	160	Chlorobenzilate		0.10	NA
Acetonitrile		5.6	38	2-Chloro-1,3-butadiene		0.057	0.28
Acetophenone		0.010	9 7	Chlorodibromomethane		0.057	15
2-Acetylaminofluorene		0 059	140	Chloroethane		0.27	6 0
Acrolein		0.29	NA	bis(2-Chloroethoxy)methane		0.036	7.2
Acrylamide		19	23	bis(2-Chloroethyl)ether		0.033	6 0
Acrylonitrile		0.24	84	2-Chloroethyl vinyl ether		0 062	NA
Aldicarb sulfone		0.056	0.28	Chloroform	A	0.046	6 0
Aldrin		0.021	0.066	bis-(2-Chloroisopropl)ether		0.055	7.2
4-Aminobiphenyl		0.13	NA	p-Chloro-m-cresol		0 018	14
Aniline		0.81	14	Chloromethane/Methyl chloride		0.19	30
Anthracene		0.059	3 4	2-Chloronaphthalene		0.055	5 6
Aramite		0.36	NA	2-Chlorophenol		0 044	5 7
Barban		0.056	1.4	3-Chloropropylene		0.036	30
Bendiocarb		0.056	1.4	Chrysene		0.059	3 4
Bendiocarb phenol		0.056	1.4	o-Cresol		0.11	5 6
Benomyl		0.056	1 4	m-Cresol (difficult to distinguish from p-Cresol)		0.77	5.6
Benz(a)anthracene		0.059	3 4	p-Cresol (difficult to distinguish from m-cresol)		0.77	5 6
Benzal Chloride		0.055	6 0	m-Cumenyl methylcarbamate		0 056	1.4
Benzene	A	0 14	10	Cycloate		0.003	1.4
Benzo(b)fluoranthene (difficult to distinguish from benzo(k)fluoranthene)		0 11	6.8	Cyclohexanone		0.36	0 75 mg/l TCLP
Benzo(k)fluoranthene (difficult to distinguish from benzo(b)fluoranthene)		0.11	6 8	o,p'-DDD		0.023	0 087
Benzo(g,h,i)perylene		0.0055	1.8	p,p'-DDD		0 023	0 087
Benzo(a)pyrene		0.061	3.4	o,p'-DDE		0.031	0 087
alpha-BHC		0.00014	0 066	p,p'-DDE		0.031	0.087
beta-BHC		0.00014	0.066	o,p'-DDT		0.0039	0 087
delta-BHC		0.023	0.066	p,p'-DDT		0.0039	0 087
gamma-BHC		0.0017	0 066	Dibenz(a,h)anthracene		0.055	8.2
Bromodichloromethane		0.35	15	Dibenz(a,e)pyrene		0.061	NA
Bromomethane/Methyl bromide		0.11	15	1,2-Dibromo-3-chloropropane		0.11	15
4-Bromophenyl phenyl ether		0 055	15	1,2-Dibromoethane/Ethylene dibromide		0.028	15
n-Butyl alcohol		5.6	2.6	Dibromomethane		0 11	15
Butyl benzyl phthalate		0.017	28	m-Dichlorobenzene		0.036	6 0
Butylate		0.003	1 4	o-Dichlorobenzene		0.088	6.0
2-sec-Butyl-4,6-dinitrophenol/Dinoseb		0 066	2.5	p-Dichlorobenzene		0.090	6.0
Carbaryl		0.006	0.14	Dichlorodifluoromethane		0.23	7.2
Carbendazim		0 056	1 4	1,1-Dichloroethane		0.059	6 0
Carbofuran		0.006	0.14	1,2-Dichloroethane		0.21	6.0
Carbofuran phenol		0.056	1 4	1,1-Dichloroethylene		0.025	6 0
Carbon disulfide		3 8	4 8 mg/l TCLP	trans-1,2-Dichloroethylene		0 054	30
Carbon tetrachloride	A	0.057	6 0	2,4-Dichlorophenol		0.044	14

CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)	CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)
2,6-Dichlorophenol		0 044	14	HxCDFs (All Hexachlorodibenzofurans)		0 000063	0.001
2,4-Dichlorophenoxyacetic acid/2,4-D		0.72	10	Indeno (1,2,3-c,d) pyrene		0.0055	3 4
1,2-Dichloropropane	A	0.85	18	Iodomethane		0.19	65
cis-1,3-Dichloropropylene		0 036	18	3-Iodo-2-propynyl n-butylcarbamate		0 056	1.4
trans-1,3-Dichloropropylene		0 036	18	Isobutyl alcohol		5 6	170
Dieldrin		0.017	0.13	Isodrin		0 021	0 066
Diethyl phthalate		0.20	28	Isolan		0.056	1 4
Diethylene glycol, dicarbamate		0 056	1 4	Isosafrole		0 081	2.6
p-Dimethylaminoazobenzene		0.13	NA	Kepone		0.0011	0 13
2,4-Dimethyl phenol		0 036	14	Methacrylonitrile		0.24	84
Dimethyl phthalate		0 047	28	Methanol		5.6	0 75 mg/l TCLP
Dimetilan		0.056	1 4	Methapyrilene		0 081	1.5
Di-n-butyl phthalate		0.057	28	Methiocarb		0.056	1 4
1,4-Dinitrobenzene		0.32	2.3	Methomyl		0.028	0 14
4,6-Dinitro-o-cresol		0.28	160	Methoxychlor		0.25	0 18
2,4-Dinitrophenol		0 12	160	Methyl ethyl ketone		0.28	36
2,4-Dinitrotoluene		0.32	140	Methyl isobutyl ketone	A	0.14	33
2,6-Dinitrotoluene		0.55	28	Methyl methacrylate	A	0 14	160
Di-n-octyl phthalate		0.017	28	Methyl methanesulfonate		0.018	NA
Di-n-propylnitrosamine		0.40	14	Methyl parathion		0.014	4.6
1,4-Dioxane		12 0	170	3-Methylcholanthrene		0 0055	15
Diphenylamine (difficult to distinguish from diphenylbenzidine)		0.92	13	4,4-Methylene bis(2-chloroaniline)		0.50	30
Diphenylnitrosamine (difficult to distinguish from diphenylamine)		0.92	13	Methylene chloride		0 0 089	30
1,2-Diphenylhydrazine		0.087	NA	Metolcarb		0 056	1 4
Disulfoton		0.017	6.2	Mexacarbate		0.056	1 4
Dithiocarbamates (total)		0.028	28	Molinate		0.003	1.4
Endosulfan I		0 023	0 066	Naphthalene		0 059	5 6
Endosulfan II		0.29	0.13	2-Naphthylamine		0.52	NA
Endosulfan sulfate		0 029	0 13	o-Nitroaniline		0.27	14
Endrin		0.0028	0 13	p-Nitroaniline		0.028	28
Endrin aldehyde		0.025	0.13	Nitrobenzene		0 068	14
EPTC		0 003	1.4	5-Nitro-o-toluidine		0.32	23
Ethyl acetate		0.34	33	o-Nitrophenol		0 028	13
Ethyl benzene	A	0.057	10	p-Nitrophenol		0 12	29
Ethyl cyanide/Propanenitrile		0.24	360	N-Nitrosodiethylamine		0.40	28
Ethyl ether		0 12	160	N-Nitrosodimethylamine		0 40	2.3
Ethyl methacrylate		0.14	160	N-Nitroso-di-n-butylamine		0 40	17
Ethylene oxide		0 12	NA	N-Nitrosomethylethylamine		0 40	2.3
bis(2-Ethylhexyl) phthalate		0.28	28	N-Nitrosomorpholine		0 40	2.3
Famphur		0.017	15	N-Nitrosopiperidine		0.013	35
Fluoranthene		0.068	3.4	N-Nitrosopyrrolidine		0.013	35
Fluorene		0.059	3 4	Oxamyl		0.056	0.28
Formetanate hydrochloride		0 056	1.4	Parathion		0.014	4.6
Formparanate		0.056	1 4	Total PCBs (sum of all PCB isomers, or all Aroclors)		0 10	10
Heptachlor		0.0012	0.066	Pebulate		0.003	1.4
Heptachlor epoxide		0.016	0 066	Pentachlorobenzene		0 055	10
Hexachlorobenzene		0.055	10	PeCDDs (All Pentachlorodibenzo-p-Dioxins)		0.000063	0 001
Hexachlorobutadiene		0.055	5.6	PeCDFs (All Pentachlorodibenzofurans)		0.000035	0.031
Hexachlorocyclopentadiene		0 057	2.4	Pentachloroethane		0 055	6 0
Hexachloroethane		0.055	30	Pentachloronitrobenzene		0 055	4 8
Hexachloropropylene		0 035	30	Pentachlorophenol		0.089	7 4
HxCDDs (All Hexachlorodibenzo-p-Dioxins)		0.000063	0.001	Phenacetin		0.081	16

CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)	CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)
Phenanthrene		0.059	5.6	1,1,1-Trichloroethane	A	0.054	6.0
Phenol		0.039	6.2	1,1,2-Trichloroethane		0.054	6.0
o-Phenylenediamine		0.056	5.6	Trichloroethylene	A	0.054	6.0
Phorate		0.021	4.6	Trichloromonofluoromethane		0.020	30
Phthalic acid		0.055	28	2,4,5-Trichlorophenol		0.18	7.4
Phthalic anhydride		0.055	28	2,4,6-Trichlorophenol		0.035	7.4
Physostigmine		0.056	1.4	2,4,5-Trichlorophenoxyacetic acid/2,4,5-T		0.72	7.9
Physostigmine salicylate		0.056	1.4	1,2,3-Trichloropropane		0.85	30
Promecarb		0.056	1.4	1,1,2-Trichloro-2,2,2-trifluoroethane		0.057	30
Procamide		0.093	1.5	Triethylamine		0.081	1.5
Propham		0.056	1.4	tris-(2,3-Dibromopropyl) phosphate		0.11	0.10
Propoxur		0.056	1.4	Vernolate		0.003	1.4
Prosulfocarb		0.003	1.4	Vinyl chloride		0.27	6.0
Pyrene		0.067	8.2	Xylenes-mixed isomers (sum of o-, m-, and p-xylene concentrations)	A	0.32	30
Pyridine	A	0.014	16	INORGANIC			
Safrole		0.081	22	Antimony		1.9	2.1 mg/l TCLP
Silvex (2,4,5-TP		0.72	7.9	Arsenic		1.4	5.0 mg/l TCLP
1,2,4,5-Tetrachlorobenzene		0.055	14	Barium		1.2	7.6 mg/l TCLP
TCDDs (All Tetrachlorodibenzo-p-dioxins)		0.000063	0.001	Beryllium		0.82	0.014 mg/l TCLP
TCDFs (All Tetrachlorodibenzofurans)		0.000063	0.001	Cadmium		0.69	0.19 mg/l TCLP
1,1,1,2-Tetrachloroethane		0.057	6.0	Chromium (Total)		2.77	0.86 mg/l TCLP
1,1,2,2-Tetrachloroethane		0.057	6.0	Cyanides (Total)[3]		1.2	590
Tetrachloroethylene	A	0.056	6.0	Cyanides (Amenable)[3]		0.86	30
2,3,4,6-Tetrachlorophenol		0.030	7.4	Lead		0.69	0.37 mg/l TCLP
Thiodicarb		0.019	1.4	Mercury--Nonwastewater from Retort		NA	0.20 mg/l TCLP
Thiophanate-methyl		0.056	1.4	Mercury--All Others	A	0.15	0.025 mg/l TCLP
Tirpate		0.056	0.28	Nickel		3.98	5.0 mg/l TCLP
Toluene	A	0.080	10	Selenium		0.82	0.16 mg/l TCLP
Toxaphene		0.0095	2.6	Silver		0.43	0.30 mg/l TCLP
Triallate		0.003	1.4	Sulfide		14	NA
Tribromomethane/Bromoform		0.63	15	Thallium		1.4	0.78 mg/l TCLP
1,2,4-Trichlorobenzene		0.055	19				

Notes to table:

[1]Concentration standards for wastewaters are expressed in mg/l are based on analysis of composite samples.

[2]Except for Metals (EP or TCLP) and Cyanides (Total and Amenable) the nonwastewater treatment standards expressed as a concentration were established, in part, based upon incineration in units operated in accordance with the technical requirements of 40 CFR part 264, subpart O or 40 CFR part 265, subpart O, or based upon combustion in fuel substitution units operating in accordance with applicable technical requirements. A facility may comply with these treatment standards according to provisions in 40 CFR 268 40(d). All concentration standards for nonwastewaters are based on analysis of grab samples.

[3]Both Cyanides (Total) and Cyanides (Amenable) for nonwastewaters are to be analyzed using Method 9010 or 9012, found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods." EPA Publication SW-846, as incorporated by reference in 40 CFR 260.11, with a sample size of 10 grams and a distillation time of one hour and 15 minutes.

Attachment 2

Table Tying Waste Origination to Waste Codes, Waste Containers and Corresponding Sample Numbers

Table A2-1 Tie Between Waste Origination, Waste Codes, Individual Waste Containers and Corresponding Sample Numbers for Granulated Activated Carbon (GAC) Proposed for Incineration at INEEL WERF June 25, 1997 (4:02PM)

Debris Type	Regulatory Classification	Packaging	NRWOL/ Container numbers	Interim Storage	Expected Disposition	Sampling Analysis/Media	Approx Volume (yd^3)
radioactive GAC - T-3/T-4	Mixed Waste D009, D040	4 waste crates and 10, 55-gal drums	12524-8/ P02172,P02173,P02174, P02175, D87113, D87117, D87118, D87119, D87121, D87122, D87126, D87128, D87130, D87132	Unit 13, and 15a	incineration at INEL's WERF, ash disposal at Envirocare	DB00012RM TCLP (full suite), reactive sulfide, reactive cyanide, DB00015RM VOA screen, DB00038RM Isotopic alpha, sulfur, total metals	15
radioactive GAC - Ryan's Pit &T-3/T-4	Mixed Waste F001/F002 (derived from rule) D009, D040	3 waste crates	NRWOL T0083928/ P02176, P02243, P02245	Unit 13	incineration at INEL's WERF, ash disposal at Envirocare	Same as above	7
radioactive GAC - Building 891 (CWTF)	Mixed Waste F001/F002 (derived from rule)	20, 55-gal drums	T0089808-1/ D87311, D87384, D87308, D87307, D87306, D87305, D87127, D87385, D87304, D87382, D87388, D87387, D87389, D87310, D87386, D87383, D87302, D87303, D87309, D87712	Unit 1804	incineration at INEL's WERF, ash disposal at Envirocare	Sample FT20601RG total VOAs, total metals, isotopic alpha Sample FT20604RG TCLP VOAs, TCLP metals, reactive sulfide, reactive cyanide, pH, DB00039RM sulfur	5

Attachment 3

Analytical Summary Tables, Analytical Data (Form 1's), Log Sheets, and Chain of Custody Forms

Table A3-1 Summary Results of GAC Samples June 25, 1997 (2:50PM)

Sample Number	Sample Date	Analyses	Media	Results	Comments
DB00012RM DB00013RM	8/26/96	Full suiteTCLP (+Cu, Zn), +reactive sulfide and cyanide	T/3/T4 spent GAC from System 1 (worst case) - from drum D87122	0 45 mg/l PCE **0 55 mg/l TCE - Hazardous** 2 0 mg/l 2-Butanone (methyl- ethyl-ketone) 0 14 mg/l Benzene 0 052 mg/l Carbon tetrachloride 0 12 mg/l Chloroform 0 7 mg/l Pyridine (E) (probable UTS) 0 304 mg/l Barium **0 617 mg/l mercury-Hazardous** 0 239 mg/l Zinc 0 2 mg/kg - Reactive Cyanide	Hazardous for TCE and mercury DB00013RM is the QC trip blank
DB00015RM	9/10/96	VOA Screen	T3/T4 spent GAC from System 1 (worst case) - from drum D87122	8,200 ppm PCE (E) 2,300 ppm TCE 280 ppm 1,2-Dichloropropane 270 ppm Benzene 190 ppm Toluene 170 ppm Carbon tetrachloride 120 ppm 1,1,1-Trichloroethane 78 ppm Chloroform 70 ppm Xylene (total) 43 ppm ethylbenzene (J) 38 ppm 4-Methyl-2-Pentanone 16 ppm styrene (J) Sample was re-run because of the "E" flag on PCE (sample DB00015RM-DL) 7,400 ppm PCE 2,100 ppm TCE 240 ppm 1,2-Dichloropropane(J) 250 ppm Benzene 180 ppm Toluene(J) 160 ppm Carbon tetrachloride(J) 120 ppm 1,1,1-Trichloroethane(J) 76 ppm Chloroform(J) 52 ppm Xylene (total) 56 ppm ethylbenzene (J)	Process knowledge indicates that would be the highest VOA concentration GAC
DB00038RM	5/28/97	Total sulfur Total Metals Isotopics	T3/T4 spent GAC from System 1 (worst case) - from drum D87122	0 945 mg/kg sulfur 41 3 mg/kg mercury isotopics 0 20+/-0 066 pCi/g U-238 (MDA 0 041) 0 013+/-0 013 pCi/g U-235 (MDA 0 050) 0 037+/-0 032 pCi/g U-233/234 (MDA 0 041) 0 002+/-0 003 pCi/g Pu-238 (MDA 0 006) 0 013+/-0 005 pCi/g Pu-239/240 (MDA 0 005) 0 004+/-0 004 pCi/g Am-241 (MDA 0 004) -0 004+/-0 007 pCi/g Th-232 (MDA 0 027) 0 025+/-0 028 pCi/g Th-228 (MDA 0 051)	

Sample Number	Sample Date	Analyses	Media	Results	Comments
FT20601RG	12/05/96	Total VOAs, total metals, isotopics	GAC from CWTF	VOAS 12 ppm PCE 0 830 ppm TCE 0 39 ppm Toluene(J) 0 33 ppm 1,1,1-Trichloroethane(J) 1 1 ppm Xylene (total) 0 31 ppm ethylbenzene (J) 0 19 ppm 4-methyl-2-pentanone (J) significant metal detections 51,348 4 ppm copper isotopics 9 88+/-0 36 pCi/g U-238 (MDA 0 01) 0 240+/-0 032 pCi/g U-235 (MDA 0 011) 7 21+/-0 27 pCi/g U-233/234 (MDA 0 03) 0 376+/-0 034 pCi/g Pu-239/240 (MDA 0 016) 0 382+/-0 050 pCi/g Am-241 (MDA 0 028)	
FT20604RG	01/28/97	Reactive sulfide and cyanide, pH, TCLP VOAs, TCLP metals	GAC from CWTF	4 8 mg/kg reactive cyanide 8 0 mg/kg reactive sulfide 7 6 pH TCLP VOAs = all non detects TCLP metals 0 0033 mg/L mercury	
DB0039RM	5/28/97	Total sulfur	GAC from CWTF	7 7 mg/kg sulfur	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DB00012RM

Lab Name QUANTERRA MO Contract: 262-01

Lab Code ITMO Case No.: V93301 SDG No S1235

Matrix (soil/water) WATER Lab Sample ID: 11933-001

Sample wt/vol: 5 00 (g/mL) ML Lab File ID: F6663

Level (low/med) LOW Date Received: 08/26/96

% Moisture not dec Date Analyzed: 09/10/96

Column (pack/cap) CAP Dilution Factor: 10

CAS NO	COMPOUND	CONCENTRATION UNITS. (ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl Chloride	100	U
75-35-4	1,1-Dichloroethene	50	U
67-66-3	Chloroform	120	
107-06-2	1,2-Dichloroethane	50	U
78-93-3	2-Butanone	2000	
56-23-5	Carbon Tetrachloride	52	
79-01-6	Trichloroethene	550	
71-43-2	Benzene	140	
127-18-4	Tetrachloroethene	450	
108-90-7	Chlorobenzene	50	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DB00012RM

Lab Name QUANTERRA, MO Contract 262-01

Lab Code ITMO Case No _____ SAS No _____ SDG No S1233

Matrix (soil/water) TCLP Lab Sample ID 11933-001

Sample wt/vol 100 (g/ml) ML Lab File ID _____

Level (low/med) LOW Date Sampled 08-26-96

% Moisture not dec _____ dec _____ Date Extracted 09-12-96

Extraction (SepF/Cont/Sonc) SEPF Date Analyzed 09-13-96

GPC Cleanup (Y/N) N pH _____ Dilution Factor 1

CAS NO	Compound	CONCENTRATION UNITS (ug/L or ug/Kg) UG/L	Q
58-89-9	gamma-BHC (Lindane)	0.50	U
76-44-8	Heptachlor	0.50	U
1024-57-3	Heptachlor epoxide	0.50	U
72-20-8	Endrin	0.50	U
72-43-5	Methoxychlor	1.0	U
57-74-9	Chlordane (technical)	5.0	U
8001-35-2	Toxaphene	20	U

U Concentration of analyte is less than the value given

FORM I PEST

1D

HERBICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DB00012RM

Lab Name. QUANTERRA,MO Contract 262.01

Lab Code: ITMO Case No.: _____ SAS No.. _____ SDG No S1232

Matrix. (soil/water) TCLP Lab Sample ID 11933-001

Sample wt/vol. 00 (g/ml) ml Lab File ID _____

Level. (low/med) LOW Date Sampled . 08-26-96

% Moisture: not dec._____ dec _____ Date Extracted: 09-16-96

Extraction: (SepF/Cont/Sonc/Shak) SEPF Date Analyzed: 09-18-96

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1

CONCENTRATION UNITS:
(ug/L or ug/L) ug/L

CAS NO.	Compound		Q
94-75-7	2,4-D	40	U
93-72-1	2,4,5-TP	10	U

U Concentration of analyte is less than the value given.

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DB00012RM

Lab Name: QUANTERRA MO Contract: 262-02

Lab Code: ITMO Case No.. S93301 SAS No.: SDG No.: S1230

Matrix: (soil/water) WATER Lab Sample ID: 11933-001

Sample wt/vol: 200 0 (g/mL) ML Lab File ID: D0306

Level: (low/med) LOW Date Received: 08/26/96

% Moisture: decanted: (Y/N) Date Extracted: 09/19/96

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 09/20/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-86-1	Pyridine	700	E
106-46-7	1,4-Dichlorobenzene	50	U
95-48-7	2-Methylphenol	50	U
106-44-5	4-Methylphenol	50	U
67-72-1	Hexachloroethane	50	U
98-95-3	Nitrobenzene	50	U
87-68-3	Hexachlorobutadiene	50	U
88-06-2	2,4,6-Trichlorophenol	50	U
95-95-4	2,4,5-Trichlorophenol	50	U
121-14-2	2,4-Dinitrotoluene	50	U
118-74-1	Hexachlorobenzene	50	U
87-86-5	Pentachlorophenol	250	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DB00012RMDL

Lab Name: QUANTERRA MO Contract: 262-02

Lab Code: ITMO Case No.: 893301 SAS No.: SDG No.: S1230

Matrix: (soil/water) WATER Lab Sample ID: 11933-001DL

Sample wt/vol: 200.0 (g/mL) ML Lab File ID: H8139

Level: (low/med) LOW Date Received: 08/26/96

% Moisture: decanted: (Y/N) Date Extracted: 09/19/96

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 09/22/96

Injection Volume: 2.0(uL) Dilution Factor: 4.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-86-1	Pyridine	630	D
106-46-7	1,4-Dichlorobenzene	200	U
95-48-7	2-Methylphenol	200	U
106-44-5	4-Methylphenol	200	U
67-72-1	Hexachloroethane	200	U
98-95-3	Nitrobenzene	200	U
87-68-3	Hexachlorobutadiene	200	U
88-06-2	2,4,6-Trichlorophenol	200	U
95-95-4	2,4,5-Trichlorophenol	200	U
121-14-2	2,4-Dinitrotoluene	200	U
118-74-1	Hexachlorobenzene	200	U
87-86-5	Pentachlorophenol	1000	U

U S EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO

DB00012RM

Lab Name QUANTERRA_MO Contract 262 01

Lab Code ITMO Case No SAS No SDG No S1231

Matrix (soil/water). WATER Lab Sample ID P11933-001

Level (low/med) LOW Date Received 08/26/96

% Solids 0.0

Concentration Units (ug/L or mg/kg dry weight) UG/L

CAS No	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	64 1	U		P
7440-39-3	Barium	304			P
7440-43-9	Cadmium	3 3	U		P
7440-47-3	Chromium	2 9	U		P
7440-50-8	Copper	7 2	U		P
7439-92-1	Lead	43 6	U		P
7439-97-6	Mercury	617			CV
7782-49-2	Selenium	52 6	U		P
7440-22-4	Silver	4.0	U		P
7440-66-6	Zinc	239			P

Color Before: Clarity Before Texture

Color After: Clarity After Artifacts

Comments

FORM I - IN

TCLP

Quanterra®
Environmental Services

96L1091

Report Date: 09/26/95

Client ID	Quanterra ID	Analyte	Analysis Date	Result	Units	Det Lmt	Dil
DB00012RM	11933-001	Reactive Sulfide	09/04/96	<22.2	mg/kg	22.2	1
-	QCBLK111571	Reactive Sulfide	09/04/96	<4 44	mg/kg	4 44	1
-	QCLCS111571	Reactive Sulfide	09/04/96	96	%Recovery	4 44	1
DB00012RM	11933-001	Reactive Cyanide	09/03/96	0 20	mg/kg	0 10	1
-	QCBLK111378	Reactive Cyanide	09/03/96	<0.10	mg/kg	0.10	1
-	QCLCS111378	Reactive Cyanide	09/03/96	16	%Recovery	0.10	1

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

DB00013RM

Lab Name QUANTERRA MO Contract 262-01

Lab Code ITMO Case No V93302 SDG No S1236

Matrix (soil/water) WATER Lab Sample ID 11933-002

Sample wt/vol 5 00 (g/mL) ML Lab File ID F6616

Level (low/med) LOW Date Received 08/26/96

% Moisture not dec Date Analyzed. 09/08/96

Column (pack/cap) CAP Dilution Factor 1 0

CAS NO	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	100	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
110-75-8	2-Chloroethyl Vinyl Ether	10	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

Lab Name E G &G , Rocky Flats Contract

Lab Code. GLAB Case No SAS No SDG No .

Matrix (soil/water) SOIL Lab Sample ID DB00015RM

Sample wt/vol. 4 000 (g/mL) G Lab File ID SEP1002

Level· (low/med) MED Date Received 09/10/96

% Moisture not dec. 0 Date Analyzed 09/10/96

GC Column· DBVRX ID 32 (mm) Dilution Factor 12,500

CAS NO.	COMPOUND	CONCENTRATION UNITS MG/KG	
74-87-3	Chloromethane	120	U
74-83-9	Bromomethane	120.	U
75-01-4	Vinyl Chloride	120.	U
75-00-3	Chloroethane	120.	U
75-09-2	Methylene Chloride	60.	U
67-64-1	Acetone	120	U
75-15-0	Carbon Disulfide	60	U
75-35-4	1,1-Dichloroethene	60	U
75-34-3	1,1-Dichloroethane	60.	U
544-59-2	1,2-Dichloroethene (total)	62	U
67-66-3	Chloroform	78.	
107-06-2	1,2-Dichloroethane	60	U
78-93-3	2-Butanone	120	U
71-55-6	1,1,1-Trichloroethane	120.	
56-23-5	Carbon Tetrachloride	170.	
75-27-4	Bromodichloromethane	60.	U
78-87-5	1,2-Dichloropropane	280.	
10061-01-5	cis-1,3-Dichloropropene	60.	U
79-01-6	Trichloroethene	2300.	
124-48-1	Dibromochloromethane	60.	U
79-00-5	1,1,2-Trichloroethane	60.	U
71-43-2	Benzene	270.	
10061-02-6	trans-1,3-Dichloropropene	60.	U
75-25-2	Bromoform	60.	U
108-10-1	4-Methyl-2-Pentanone	38.	J
591-78-6	2-Hexanone	120.	U
127-18-4	Tetrachloroethene	8200	E
79-34-5	1,1,2,2-Tetrachloroethane	60.	U
108-88-3	Toluene	190	
108-90-7	Chlorobenzene	60.	U
100-41-4	Ethylbenzene	43.	J
100-42-5	Styrene	16	J
1330-20-7	Xylene (total)	70.	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

Lab Name. E G &G , Rocky Flats Contract

Lab Code GLAB Case No SAS No SDG No

Matrix (soil/water) SOIL Lab Sample ID DB00015RM-DL

Sample wt/vol 4 000 (g/mL) G Lab File ID SEP1301

Level (low/med) MED Date Received 09/10/96

% Moisture not dec 0 Date Analyzed 09/13/96

GC Column DBVRX ID .32 (mm) Dilution Factor 25000

CAS NO	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	250000	U
74-83-9	Bromomethane	250000	U
75-01-4	Vinyl Chloride	250000	U
75-00-3	Chloroethane	250000	U
75-09-2	Methylene Chloride	120000	U
67-64-1	Acetone	130000.	J
75-15-0	Carbon Disulfide	120000.	U
75-35-4	1,1-Dichloroethene	120000	U
75-34-3	1,1-Dichloroethane	120000.	U
544-59-2	1,2-Dichloroethene (total)	120000.	U
67-66-3	Chloroform	66000.	J
107-06-2	1,2-Dichloroethane	120000.	U
78-93-3	2-Butanone	100000.	J
71-55-6	1,1,1-Trichloroethane	120000.	J
56-23-5	Carbon Tetrachloride	160000.	
75-27-4	Bromodichloromethane	120000.	U
78-87-5	1,2-Dichloropropane	240000	
10061-01-5	cis-1,3-Dichloropropene	120000.	U
79-01-6	Trichloroethene	2100000.	
124-48-1	Dibromochloromethane	120000	U
79-00-5	1,1,2-Trichloroethane	120000	U
71-43-2	Benzene	240000.	
10061-02-6	trans-1,3-Dichloropropene	120000.	U
75-25-2	Bromoform	120000	U
108-10-1	4-Methyl-2-Pentanone	250000	U
591-78-6	2-Hexanone	28000.	J
127-18-4	Tetrachloroethene	7400000.	E
79-34-5	1,1,2,2-Tetrachloroethane	120000.	U
108-88-3	Toluene	180000	
108-90-7	Chlorobenzene	120000	U
100-41-4	Ethylbenzene	56000	J
100-42-5	Styrene	120000	U
1330-20-7	Xylene (total)	65000	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: E.G.&G , Rocky Flats Contract

Lab Code: GLAB Case No SAS No SDG No

Matrix. (soil/water) SOIL Lab Sample ID DB00015RM-DL

Sample wt/vol: 4 000 (g/mL) G Lab File ID SEP1303

Level: (low/med) MED Date Received 09/10/96

% Moisture: not dec 0 Date Analyzed: 09/13/96

GC Column: DBVRX ID: 32 (mm) Dilution Factor: 50000

CAS NO	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	490000	U
74-83-9	Bromomethane	490000	U
75-01-4	Vinyl Chloride	490000	U
75-00-3	Chloroethane	490000	U
75-09-2	Methylene Chloride	240000	U
67-64-1	Acetone	140000.	J
75-15-0	Carbon Disulfide	240000	U
75-35-4	1,1-Dichloroethene	240000	U
75-34-3	1,1-Dichloroethane	240000	U
544-59-2	1,2-Dichloroethene (total)	240000	U
67-66-3	Chloroform	76000	J
107-06-2	1,2-Dichloroethane	240000	U
78-93-3	2-Butanone	110000	J
71-55-6	1,1,1-Trichloroethane	120000	J
56-23-5	Carbon Tetrachloride	150000	J
75-27-4	Bromodichloromethane	240000	U
78-87-5	1,2-Dichloropropane	240000	J
10061-01-5	cis-1,3-Dichloropropene	240000	U
79-01-6	Trichloroethene	2100000	
124-48-1	Dibromochloromethane	240000	U
79-00-5	1,1,2-Trichloroethane	240000	U
71-43-2	Benzene	250000	
10061-02-6	trans-1,3-Dichloropropene	240000	U
75-25-2	Bromoform	240000	U
108-10-1	4-Methyl-2-Pentanone	490000	U
591-78-6	2-Hexanone	490000	U
127 18-4	Tetrachloroethene	7400000	
79-34-5	1,1,2,2-Tetrachloroethane	240000	U
108-88-3	Toluene	180000	J
108-90-7	Chlorobenzene	240000	U
100 41-4	Ethylbenzene	240000	U
100-42 5	Styrene	240000	U
1330-20-7	Xylene (total)	52000	J

facsimile
TRANSMITTAL

to: Norm Stoner, Kaiser Hill
fax #: 303-966-3400
re: wo 11491 samples rec'd 5-29-97
date: June 6, 1997
pages: 2, including this cover sheet

Attached please find the sulfur results for samples received 5-29-97. Samples were run in duplicate and the average is reported. A hard copy of the data is to follow.

97A1750

From the desk of

Sydney Gorton
Senior Technician
Southwest Research Institute
6220 Culebra Road
San Antonio, Texas 78228

210-522-2476
Fax 210-522-2021

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Lab Name Southwest Research Institute

Client: Kaiser Hill

Lab Code SwRI

Date Received. 05/29/97

Matrix Solid

Project No.· 01-8359-164

Sample ID	Lab System ID	Sulfur Result (ug/g)
PBW	—	<150
DB00038RM	90153	945
DB00039RM	90154	7700

Detection Limit: 150 ug/g

97A1780

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO

A1780

Lab Name WESTON_EMT Contract·

Lab Code WESEMT Case No · SAS No. SDG No.: 97A1780_

Matrix (soil/water). SOIL_ Lab Sample ID· 9705G943-001

Level (low/med). LOW__ Date Received: 05/29/97

% Solids. 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429 90-5	Aluminum	29.2			P
7440-36-0	Antimony	0 14	U	N	P
7440-38-2	Arsenic	0.20	U		P
7440-39-3	Barium	1 2	B		P
7440-41-7	Beryllium	0 02	B		P
7440-43-9	Cadmium	0.03	U		P
7440-70-2	Calcium	246	B		P
7440-47-3	Chromium	0.41			P
7440-48-4	Cobalt	0 08	B		P
7440-50-8	Copper	19 4		N*	P
7439-89-6	Iron	58.5			P
7439-92-1	Lead	0.32			P
7439-95-4	Magnesium	178	B		P
7439-96-5	Manganese	3.4			P
7439-97-6	Mercury	41 3			CV
7440-02-0	Nickel	0.17	B		P
7440-09-7	Potassium	6910			P
7782-49-2	Selenium	0.59	B	N	P
7440-22-4	Silver	0.89		*	P
7440-23-5	Sodium	451	B		P
7440-28-0	Thallium	0.22	U	N	P
7440-62-2	Vanadium	0.12	B		P
7440 66-6	Zinc	2.8	B		P
	Cyanide				NR

Color Before. BLACK_ Clarity Before· Texture· COARSE

Color After: GREY Clarity After· Artifacts

Comments: Client ID: DB00038RM

6/3/97

Thermo NUtech

QC RESULTS

SDG	2042	Client	KAISER HILL
Work Order	N705081	Contract	KH224141EA3
Received Date	05/29/97	Matrix	SOLID

Lab Sample ID	Nuclide	Results	Units	Amount Added	MDA	Evaluation
BLANK						
2042-003	Americium 241	0 013 ± 0 009	pCi/Smpl	NA	0 008	
	Plutonium 238	0 ± 0 007	pCi/Smpl	NA	0 016	<MDA
	Plutonium 239/240	-0 002 ± 0 002	pCi/Smpl	NA	0 012	<MDA
	Uranium 233/234	0 ± 0 012	pCi/Smpl	NA	0 047	<MDA
	Uranium 235	0 ± 0 015	pCi/Smpl	NA	0 057	<MDA
	Uranium 238	0 ± 0 012	pCi/Smpl	NA	0 047	<MDA
LCS						
2042-002	Americium 241	0 95 ± 0 080	pCi/Smpl	0 902	0 019	105% recovery
	Plutonium 238	1 0 ± 0 086	pCi/Smpl	1 02	0 020	98% recovery
	Plutonium 239/240	1 0 ± 0 086	pCi/Smpl	0 926	0 012	108% recovery
	Uranium 233/234	4 8 ± 0 49	pCi/Smpl	4 86	0 22	99% recovery
	Uranium 235	3 9 ± 0 42	pCi/Smpl	3 72	0 051	105% recovery
	Uranium 238	4 6 ± 0 47	pCi/Smpl	4 83	0 21	95% recovery

DUPLICATES				ORIGINALS					
Sample ID	Nuclide	Results ± 2σ	MDA	Sample ID	Results ± 2σ	MDA	RPD	3σ (Tot)	Eval
2042-004	Americium 241	0 006 ± 0 004	0 005	2042-001	0 004 ± 0 004	0 004	40	171	satis
	Plutonium 238	0 003 ± 0 005	0 008		0 002 ± 0 003	0 006	-		satis
	Plutonium 239/240	0 035 ± 0 008	0 005		0 013 ± 0 005	0 005	92	59	unsat
	Uranium 233/234	0 039 ± 0 034	0 043		0 037 ± 0 032	0 041	-		satis
	Uranium 235	0 014 ± 0 014	0 052		0 013 ± 0.013	0 050	-		satis
	Uranium 238	0 17 ± 0 068	0 043		0 20 ± 0 066	0 041	16	77	satis

Certified by [signature]
Report Date 06/13/97
Page 2

Thermo NUtech

97A1780

ANALYSIS RESULTS

SDG 2042
Work Order N705081
Received Date 05/29/97

Client KAISER HILL
Contract KH224141EA3
Matrix ~~WATER~~ GAC 6/26/19

Client Sample ID	Lab Sample ID	Collected	Analyzed	Nuclide	Results ± 2σ	Units	MDA
DB00038RM	2042-001	05/28/97	06/09/97	Am 241	0 004 ± 0 004	pCi/g	0 004
			06/12/97	Pu 238	0 002 ± 0 003	pCi/g	0 006
			06/12/97	Pu 239/240	0 013 ± 0 005	pCi/g	0 005
			06/18/97	Th 232	-0 004 ± 0 007	pCi/g	0 027
			06/18/97	Th 230	U	pCi/g	0 043
			06/18/97	Th 228	0 025 ± 0 028	pCi/g	0 051
			06/03/97	U 233/234	0 037 ± 0 032	pCi/g	0.041
			06/03/97	U 235	0.013 ± 0 013	pCi/g	0.050
			06/03/97	U 238	0 20 ± 0 066	pCi/g	0 041

Certified by _____
Report Date 06/19/97
Page 1

96L0236

U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

L02361

Lab Name: ROCKY FLATS ANALYTICAL Contract:

Lab Code: B559 Case No.. SAS No.: 97L SDG No.: L0236A

Matrix (soil/water): SOIL Lab Sample ID FT20601RG

Level (low/med): LOW Date Received 12/05/97

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver				
7440-38-2	Arsenic	2.0		N	F
7440-43-9	Cadmium				
7440-46-2	Cesium	5.0	U		A
7439-97-6	Mercury				
7439-92-1	Lead	8.7			F
7782-49-2	Selenium	1.6			F
7440-28-0	Thallium	0.50	U		F

Color Before: BROWN Clarity Before: CLOUDY Texture: COURSE

Color After: BROWN Clarity After: CLOUDY Artifacts: YES

Comments:

1/17/97

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
23601

Lab Name: E.G.&G., Rocky Flats Contract:

Lab Code: GLAB Case No.: SAS No.: 97L0 SDG No.: GA-C

Matrix: (soil/water) SOIL Lab Sample ID: FT20601RG

Sample wt/vol: 4.000 (g/mL) G Lab File ID: DEC0901

Level: (low/med) MED Date Received: 12/05/96

% Moisture: not dec. Not Det. Date Analyzed: 12/09/96

GC Column: DBVRX ID: .32 (mm) Dilution Factor: 125.0

Soil Extract Volume: 10000. (uL) Soil Aliquot Volume: 100. (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1200.	U
74-83-9	Bromomethane	1200.	U
75-01-4	Vinyl Chloride	1200.	U
75-00-3	Chloroethane	1200.	U
75-09-2	Methylene Chloride	600.	U
67-64-1	Acetone	720.	BJ
75-15-0	Carbon Disulfide	600.	U
75-35-4	1,1-Dichloroethene	600.	U
75-34-3	1,1-Dichloroethane	600.	U
544-59-2	1,2-Dichloroethene (total)	620.	U
67-66-3	Chloroform	600.	U
107-06-2	1,2-Dichloroethane	600.	U
78-93-3	2-Butanone	540.	BJ
71-55-6	1,1,1-Trichloroethane	330.	J
56-23-5	Carbon Tetrachloride	600.	U
75-27-4	Bromodichloromethane	600.	U
78-87-5	1,2-Dichloropropane	600.	U
10061-01-5	cis-1,3-Dichloropropene	600.	U
79-01-6	Trichloroethene	830.	
124-48-1	Dibromochloromethane	600.	U
79-00-5	1,1,2-Trichloroethane	600.	U
71-43-2	Benzene	600.	U
10061-02-6	trans-1,3-Dichloropropene	600.	U
75-25-2	Bromoform	600.	U
108-10-1	4-Methyl-2-Pentanone	190.	J
591-78-6	2-Hexanone	1200.	U
127-18-4	Tetrachloroethene	12000.	
79-34-5	1,1,2,2-Tetrachloroethane	600.	U
108-88-3	Toluene	390.	J
108-90-7	Chlorobenzene	600.	U
100-41-4	Ethylbenzene	310.	J
100-42-5	Styrene	600.	U
1330-20-7	Xylene (total)	1100.	

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

23601

Lab Name: E.G.&G., Rocky Flats Contract:

Lab Code: GLAB Case No.: SAS No.: 97L0 SDG No.:

Matrix: (soil/water) SOIL Lab Sample ID: FT20601RG

Sample wt/vol: 4.000 (g/mL) G Lab File ID: DEC0901

Level: (low/med) MED Date Received: 12/05/96

% Moisture: not dec. Not Det. Date Analyzed: 12/09/96

GC Column: DBVRX ID: .32 (mm) Dilution Factor: 125.0

Soil Extract Volume: 10000. (uL) Soil Aliquot Volume: 100. (uL)

Number TICs found: 1 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q J N
1.	470-82-6	Eucalyptol	30.42	800.	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
FORM 1A-I

INORGANIC ANALYSIS DATA SHEET

Lab Name: Building 881 General Laboratories Sample No.: 1

APO Sample ID: 97L0236-001 FT20601RG RS9

Section: ICPAES

% Solids (0 = N/A): 100.00 SDG No.: DEC17.001

Date Sampled: 12/05/96 QC Report No: 97L0236.CPT

Lab Receipt Date: 12/05/96

Report Date: 12/17/96 SOW No.: N/A
Contract: N/A

Matrix Level (Soil,Water): OTHER LOW

Elements Identified and Measured

Concentration Units (MG/KG) As Received

Cas No	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	494.1			P
7440-36-0	Antimony	19.9	U	N	P
7440-38-2	Arsenic	79.4	U		P
7440-39-3	Barium	21.9	B		P
7440-41-7	Beryllium	1.4	B		P
7440-43-9	Cadmium	2.6	U		P
7440-70-2	Calcium	1553.4	B		P
7440-47-3	Chromium	8.9			P
7440-48-4	Cobalt	4.0	U		P
7440-50-8	Copper	51348.4			P
7439-89-6	Iron (L)	2363.1			P
7439-89-6	Iron (H)	2157.8			P
7439-92-1	Lead	36.4	U		P
7439-93-2	Lithium	2.0	U		P
7439-95-4	Magnesium	112.6	B		P
7439-96-5	Manganese	9.1	B		P
7439-98-7	Molybdenum	9.9	U	N	P
7440-02-0	Nickel	13.2	U		P
7440-09-7	Potassium	498.4	U		P
7782-49-2	Selenium	33.1	U		P
7440-21-3	Silicon	331.6		N	P
7440-22-4	Silver	30.3			P
7440-23-5	Sodium	80.8	B		P
7440-24-6	Strontium	26.4	B		P
7440-31-5	Tin	13.4	B		P
7440-32-6	Titanium	72.9			P
11-09-8	Uranium	79.4	U		P
7440-62-2	Vanadium	4.8	B		P
7440-66-6	Zinc	39.5			P

Color Before: Black Clarity Before: Opaque

Color After: Green Clarity After: Clear

Texture:

Artifacts: Coarse mesh black particulates left over after total metals digestion.

Comments: Sample = 100.00 % Solids. CLP Total Metals Digestion Results I
Deionized Water R Blank PBW is the Reagent Blank for this Sample Set
TL channel not operational.

FAXED APO
12/18/96

U S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

L02361

Lab Name ROCKY FLATS ANALYTICAL Contract.

Lab Code· B559 Case No.: SAS No : 97L SDG No.: L0236

Matrix (soil/water): SOIL Lab Sample ID: FT20601RG

Level (low/med) LOW Date Received: 12/05/96

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight) MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver				
7440-38-2	Arsenic				
7440-43-9	Cadmium				
7440-46-2	Cesium				
7439-97-6	Mercury	2.5			CV
7439-92-1	Lead				
7782-49-2	Selenium				
7440-28-0	Thallium				

Color Before: N/A Clarity Before: N/A Texture: N/A

Color After· N/A Clarity After: N/A Artifacts. N/A

Comments:

General Lab, Building 881 Lab Number: 97L0236 Report Date: 1/22/97
Sample Date: 12/05/96

RADIOCHEMISTRY REPORT
ISOTOPIC ANALYSIS RESULTS BY ALPHA SPECTROMETRY

SAMPLE ID	PLUTONIUM 239/240 (pCi/g)	BATCH #
FT20601RG	0 376 ± 0 034 (MDA 0 016)	ISO97-002
FT20601RG D	0 320 ± 0 038 (MDA 0 030)	ISO97-002

SAMPLE ID	AMERICIUM 241 (pCi/g)	BATCH #
FT20601RG	0 382 ± 0 050 (MDA 0 028)	ISO97-002
FT20601RG D	0 276 ± 0 037 (MDA 0 023)	ISO97-002

GAC

General Lab, Building 881 Lab Number: 97L0236 Report Date: 1/22/97
Sample Date: 12/05/96

RADIOCHEMISTRY REPORT
ISOTOPIC ANALYSIS RESULTS BY ALPHA SPECTROMETRY

SAMPLE ID	URANIUM 238 (pCi/g)	BATCH #
FT20601RG	9 88 ± 0 36 (MDA 0 01)	ISO97-002
FT20601RG D	8 80 ± 0 31 (MDA 0 01)	ISO97-002

SAMPLE ID	URANIUM 235 (pCi/g)	BATCH #
FT20601RG	0 240 ± 0 032 (MDA 0 011)	ISO97-002
FT20601RG D	0 231 ± 0 030 (MDA 0 010)	ISO97-002

SAMPLE ID	URANIUM 233/234 (pCi/g)	BATCH #
FT20601RG	7 21 ± 0 27 (MDA 0 03)	ISO97-002
FT20601RG D	5 96 ± 0 22 (MDA 0 03)	ISO97-002

GAC

General Inorganics

9720242

Client Name: Kaiser-Hill
Client ID: FT20604 RG
Lab ID: 053519-0001-SA
Matrix: SOIL
Authorized: 29 JAN 97
Sampled: 28 JAN 97
Prepared: See Below
Received: 29 JAN 97
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
~~Cyanide, Reactive~~	~~4.8~~	~~mg/kg~~	~~0.20~~	~~9010~~	~~04 FEB 97~~	~~07 FEB 97~~
Sulfide, Reactive	8.0	mg/kg	5.0	9030	04 FEB 97	10 FEB 97

ND = Not detected
NA = Not applicable

Reported By: Judy Lange

Approved By:

General Inorganics

9710242

Client Name: Kaiser-Hill
Client ID: FT20604 RG
Lab ID: 053519-0001-SA
Matrix: SOIL
Authorized: 29 JAN 97

Sampled: 28 JAN 97
Prepared: See Below

Received: 29 JAN 97
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	7.6	units	0.10	150.1	NA	06 FEB 97

ND = Not detected
NA = Not applicable

Reported By: Mark Foster

Approved By:

Spent GAC

VOA/TCLP-Analysis by SW846 8240B-Regulated
TCLP Leachate
Method 8240B

9710242

Client Name: Kaiser-Hill
Client ID: FT20604 RG
Lab ID: 053519-0001-SA
Matrix: SOIL

Sampled: 28 JAN 97
Received: 29 JAN 97
Authorized: 29 JAN 97

Leached: 30 JAN 97
Prepared: 30 JAN 97
Analyzed: 10 FEB 97

Parameter	Result	Units	Reporting Limit
Benzene	ND	mg/L	0.50
2-Butanone	ND	mg/L	200
Carbon tetrachloride	ND	mg/L	0.50
Chlorobenzene	ND	mg/L	100
Chloroform	ND	mg/L	6.0
1,2-Dichloroethane	ND	mg/L	0.50
1,1-Dichloroethene	ND	mg/L	0.70
Tetrachloroethene	ND	mg/L	0.70
Trichloroethene	ND	mg/L	0.50
Vinyl chloride	ND	mg/L	0.20

Surrogate	Recovery	
1,2-Dichloroethane-d4	94	%
4-Bromofluorobenzene	102	%
Toluene-d8	102	%

ND = Not detected
NA = Not applicable

Reported By: Steven Francis

Approved By: Audrey Cornell

Metals
TCLP Leachate

9710242

Client Name: Kaiser-Hill
Client ID: FT20604 RG
Lab ID: 053519-0001-SA
Matrix: SOIL

Sampled: 28 JAN 97
Received: 29 JAN 97
Authorized: 29 JAN 97

Leached: 04 FEB 97
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Barium	ND	mg/L	100	CLP ILM03.0	06 FEB 97	06 FEB 97
Cadmium	ND	mg/L	1.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Chromium	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Lead	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Mercury	0.0033	mg/L	0.0010	CLP ILM03.0	10 FEB 97	10 FEB 97
Selenium	ND	mg/L	1.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Silver	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97

ND = Not detected
NA = Not applicable

Reported By: Doug Gomer

Approved By: Jamie Wickham

T-3/T-4 Source Removal Project

Rocky Mountain Remediation Services

Project Number: 951878ES

Log Book Number: ERPD-OU2-LB-96-00176

Date August 26, 1996

Sample Team Leader Erik Thompson - MH

Member Hoji Salomon

Member Randy Scott

Time	Batch #	Sample Type	Sample Number	Location	Container Type, Size, Units	QC Code	QC Partner Sample #	Media	Preserv	Analyses Requested	COC #
0705 ~~0750~~	NA	DB	DB00011RM	CONDENSER System 2	4oz G	REAL	NONE	S	4°C	VX	RFP900414
Comments: Sample came from bottom of system 2 condenser. Sample is silt/clay fraction w/ lots of water											
0705 ~~0750~~	NA	DB	DB00011RM	CONDENSER System 2	P, 250 ml	REAL	NONE	S	NONE	RH	RFP945935
Comments: SAME comments as above											
1050	NA	DB	DB00012RM	Drum from GAC, system I	G, 500 ml	REAL	(Trip blank) DB00013RM	S	4°C	SFA - TCLP VOA SFB - TCLP SVOC SFC - TCLP Pest/Herb SFD - TCLP metals → + Cu + Zn WGA = Reactive Sulfide, Reactive Cyanide WGC	RFP900415
Comments: See Attached comment sheet for explanation											
1050	NA	DB	DB00013RM	NA	(2) G, 40 ml	Trip b	(REAL) DB00012RM	W	4°C HCl, pH<2	VBC	RFP900415
Comments.											
Comments											

8/26/96

Sampler Hoji Salomon Hoji Salomon 8/26/96
Print Sign Date

Page _____ of _____

QC/Peer Review [signature] 9/21/96
Sign Date

DB00012RM

T-3/T-4 Source Removal Project

Rocky Mountain Remediation Services

Project Number 951878ES

Log Book Number ERPD-OU2-LB-96-00176

Date August 26, 1996

Sample Team Leader Randy Scott

Member Hopi Salomon

Member

Comments Comments on sample # DB00012RM

Sample DB00012RM was collected to meet the analytical requirements to determine if the Spent T-3/T-4 GAC can be classified as non-hazardous, and be eventually shipped to Envirocare of Utah, Inc, for commercial disposal as LLW. The sample was collected by Randy Scott of M-H in level B PPE from drum # D87122 which is spent GAC from System 1 of the M-H TDU system. This GAC was used for the entire project in the system 1 Carbon bed and recently transferred to a waste drum. When opened, an FID was placed into the drum and VOCs were measured >1000 ppm. System I GAC was chosen because both the RMRS Supervisor (treatment) Mark Wood, and the M-H project Supervisor, Ron Hill, have confidence that System I GAC, because of its use through-out the project, would have the greatest probability for being classified as a hazardous waste. Therefore, this sample is expected to represent a worst case scenario. The sample was collected directly from the drum to the sample jar. (No sampling equip used).

Verification of statement above: Mark R Wood RMRS TDU Field Supervisor 8/26/96

Sampler Hopi Salomon (Print) Hopi Salomon (Sign) 8/26/96 (Date)

QC/Peer Review Sharon Garner (Print) Sharon L Garner (Sign) 8/26/96 (Date)

Ronnie Rothell, M-H Superintendent 8/26/96

96L1091

CONTRACTOR RMRS SAMPLERS Erik Thompson (M-H), Hoai Solomon, Rusty Scott ANALYTICAL CHARGE # 951878AW

SITE CONTACT/PHONE Hoai Solomon X6627 FAX Ext 4046 LAB/LOCATION Q-SL

C-O-C NUMBER RFPJ004L5

EG&G ROCKY FLATS, CHAIN OF CUSTODY

General Chemistry

DATE	TIME	SAMPLE NUMBER	LOCATION CODE	CONTAINER TYPE, SIZE, UNITS	NUMBER OF CONTAINERS	MEDIA S=SOIL, W=WATER	F=FILTERED U=UNFILTERED	R=TURN AROUND RUSH	OUT OF SPEC REPORTS	COOLED TO 4°C	NAOH	HNO3	H2SO4	HCl	VOA - CLP	VOA - 524.2 com.	BNA - CLP	PCBs/PEST CLP	TOTAL Metals-CLP+(1)	DISS Metals-CLP+(1)	WATER QUALITY (2)	NO3/NO2 as N	NH3	OIL & GREASE	Ortho-Phosphate	CYANIDE	COD	TOC	DOC	H2S	Cr VI	Tot VOAs 8240	TCLP VOA	TCLP SVOC	TCLP Pest/Herb	TCLP Metals +Cu + Zn
															V	V	B	P	M	M	W	W	W	W	W	W	W	W	W	W	V	S	S	S	S
																C				*	A	B	B	C	D	E	G	H	I	J	K	B	F	F	F	F
																C					A	C	A		A							C				O
8/26/96	1050	DB00012RM	Drums from OAC, System I	G 500 ml	1	S	C			X																						X	X	X	X
8/26/96	1050	DB00013RM	NA	G 40 ml	2	W	U			X				X																	X				

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
	8/26/96 1415		8/26/96 1415
	8/26/96 1420		8/26/96 0900

LABORATORY USE ONLY	Y	N
PCKG REC'D/CUSTODY SEALS INTACT	✓	
SAMPLE LABELS/COCs AGREE	✓	
TEMPERATURE WITHIN SPECIFICATION 2 C	✓	
CORRECTED COPY ATTACHED		
PROBLEMS OR DISCREPANCIES		

REMARKS (1) INCLUDES Cs Li Sr Mo Si Sn
(2) TSS TDS Cl F SO4 CO3 HCO3

SHIPMENT METHOD Fed X
AIR BILL NO 6648146562

RF 47987 (8/93)

Ship WHITE and YELLOW copies with sample -- Retain GREEN field copy
Deliver BLUE copy to RFEDS with Datarap Transmittal

Form EGGRFP 081393-GWCOCGC v1.1

FAX Results to Hoai Solomon (303) 966-4046

0133

T-3/T-4 Source Removal Project
Rocky Mountain Remediation Services

Project Number: 951878ES

Log Book Number. ERPD-OU2-LB-96-00176

Date 9/10/96

Sample Team Leader RE KELLOW

Member WA SCARLE

Member H SALMON

Time	Batch #	Sample Type	Sample Number	Location	Container Type, Size, Units	QC Code	QC Partner Sample #	Media	Preserv	Analyses Requested	COC #
1103	N/A	DB	DB0001SRM	DRUM FROM GAC, SYSTEM I	4OZG	Real	N/A	S	4°C	VX	RFP 900417
Comments	GAC FROM DRUM DB7122 18 ppm READING ON OVM ON CONTACT WITH GAC										
1138	N/A	DB	DB0001GRM	UNTREATED HEPA	4OZG	Real	N/A	S	4°C	VX	RFP 900417
Comments											
1138	N/A	DB	DB0001 7RM	UNTREATED HEPA	4OZG	Real	N/A	S	4°C	VX	RFP 900417
Comments											
1126	N/A	DB	DB0001ERM	RMRS GREEN CANVAS TARP	4OZ G	Real	N/A	S	4°C	VX	RFP 900417
Comments											
1124	N/A	DB	DB0001SRM	RMRS GREEN CANVAS TARP	4 OZG	Real	N/A	S	4°C	VX	RFP 900417
Comments											

Sampler Heidi Schiller Print / Sign 9/10/96 Date

Page _____ of _____

QC/Peer Review Sign 9/10/96 Date

CONTRACTOR RMRS SAMPLERS H SALOMON RE KELLOW, WA SEARLE ANALYTICAL CHARGE # 9518.8 AN

SITE CONTACT/PHONE H SALOMON /6627 FAX Ext 4046 LAB/LOCATION 881

C-O-C NUMBER RFP900417

EG&G ROCKY FLATS, CHAIN OF CUSTODY

General Chemistry

DATE	TIME	SAMPLE NUMBER	LOCATION CODE	CONTAINER TYPE, SIZE, UNITS	NUMBER OF CONTAINERS	MEDIA S=SOIL, W=WATER	F=FILTERED, U=UNFILTERED	COOLED TO 4°C	VOA Screen
9/10/96	1103	DB00015RM	DRUM FLOOR SWG SYSTEM I	4 oz G	1	S	U	X	X
	1138	DB00016RM	UNTREATED AREA		1	S	U	X	X
	1138	DB00017RM	UNTREATED AREA		1	S	U	X	X
	1126	DB00018RM	PHS GREEN CANVAS TARP		1	S	U	X	X
	1126	DB00019RM	PHS GREEN CANVAS TARP		1	S	U	X	X
	1130	DB00020RM	PH YELLOW CANVAS TARP		1	S	U	X	X
	1130	DB00021RM	PH YELLOW CANVAS TARP		1	S	U	X	X
	1146	DB00022RM	UNTREATED ASPHALT		1	S	U	X	X
	1147	DB00023RM	UNTREATED ASPHALT		1	S	U	X	X
	1150	DB00024RM	UNTREATED WOOD		1	S	U	X	X
	1151	DB00025RM	UNTREATED WOOD		1	S	U	X	X
	1121	DB00026RM	SEDIMENT FROM DECON OPS		1	S	U	X	X

	VOA - CLP	VOA - 524 2 com.	BNA - CLP	PCBs/PEST CLP	TOTAL Metals-CLP+(1)	DISS Metals-CLP+(1)	WATER QUALITY (2)	NO3/NO2 as N	NH3	OIL & GREASE	Ortho-Phosphate	CYANIDE	COD	TOC	DOC	H2S	Cr VI	VOA Screen
	V	V	B	P	M	M	W	W	W	W	W	W	W	W	W	W	W	V
BOTTLE CODES		C				*	A	B	B	C	D	E	G	H	I	J	K	X
PRESERVATIVE		C					A	C	A		A						A	

Preservative columns: COOLED TO 4°C, NAOH, HNO3, H2SO4, HCl. Also: R=TURN AROUND RUSH, OUT OF SPEC REPORTS.

RELINQUISHED BY	DATE/TIME		RECEIVED BY	DATE/TIME	
[signature]	9/10/96	1447	[signature]	9-10-96	1447

LABORATORY USE ONLY	Y	N
PCKG REC'D/CUSTODY SEALS INTACT	X	
SAMPLE LABELS/COCs AGREE	X	
TEMPERATURE WITHIN SPECIFICATION ______ C		
CORRECTED COPY ATTACHED		
PROBLEMS OR DISCREPANCIES		

SHIPMENT METHOD HAND DEL
AIR BILL NO N/A

REMARKS (1) INCLUDES Cs,Li,Sr,Mo,Si,Sn
(2) TSS TDS,Cl F,SO4,CO3,HCO3

Ship WHITE and YELLOW copies with samples -- Retain GREEN field copy
Deliver BLUE copy to RFEDS with Datacap Transmittal

RF 47987 (8/93)

Form. EGGRFP-081393-GWCOCGC-v1 1

T-3/T-4 Source Removal Project

Rocky Mountain Remediation Services

Project Number 951878ES

Log Book Number ERPD-OU2-LB-96-00176

Date MAY 28, 1997

Sample Team Leader Hopi Salomon

Member William Searle (collecting SAMPLE)

Member Ray Kellow - Assisting.

Note SAMPLES OF SPENT GAC to support incineration at INEEL WERF INCINERATOR

Time	Batch #	Sample Type	Sample Number	Location	Container Type, Size, Units	QC Code	QC Partner Sample #	Media	Preserv	Analyses Requested	COC #
0945	NA	DB	(97A1780-001-002) DB00038RM	D87122	glass 125 ml	REAL	NONE	S	NONE	Pu, Am, U, Th Isotopics	RFP 945963
Comments	sniffed drum # D87122 after lid was removed outside of 2 plastic liners with Jerome mercury vapor analyzer Trace mercury 0.003 mg/m³ was detected Would expect higher levels if we had sniffed inside inner bag Jerome Serial # = 2536, calibrated by Steve Aldredge this morning This GAC originated from system I of the T3/T4 TDU system (worst case). This drum was previously sampled (DB00012RM, DB00013RM)										
0945	NA	DB	(97A1780-001-001) DB00038RM	D87122	glass, 250 ml	REAL	NONE	S	4°C	(SS058003) Total metals + Hg	RFP 900449
Comments	SAME AS ABOVE										
0945	NA	DB	(97A1780-001-003) DB00038RM	D87122	glass, 125 ml	REAL	NONE	S	4°C	Total Sulfur	RFP 900450
Comments	SAME AS ABOVE										
1015	NA	DB	(97A1780-002-001) DB00039RM	D87309	glass, 125 ml	REAL	NONE	S	4°C	Total Sulfur	RFP 900450
Comments	sniffed drum D87309 contents (inside inner bag) with Jerome mercury vapor analyzer – No mercury detected PPE, sampling scoops are being disposed by Mike Repping Steve Aldredge evaluated (sniffed) bag of PPE, scoops with OVA, Mercury vapor analyzer and detected nothing This GAC originated from the CWTF (Building 891)										
Comments											

5/28/97

Sampler Hopi Salomon Hopi Salomon 5/28/97
Print Sign Date

QC/Peer Review [signature] 5/28/97
Sign Date

COC # RFP 900449

1 of 1

SAMPLERS (Signature) W. Seal 510963 / RE 510815 / [signature]

REPORT IDENTIFICATION NUMBER (RIN) 97A1780

LAB/LOCATION WESTON - Gulf Coast

RFETS CONTRACTOR RMRS

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE CHAIN OF CUSTODY

DATE	TIME	EVENT	BOTTLE	USER ID	LOCATION	CONTAINER	MATRIX	Preservation: Cooled to 4 C	NaOH	HNO3	H2 SO4	HCl	Analyses: SS05B003 Total metals + mercury
5/28/97	0945	001	001	DB00038RM	D87122	Glass, 250ml	GAC	X					U

5/28/97

Relinquished By	Received By/Organization	Date	Time
RE 5/28/97 1100	[signature]	5/28/97	1100

LABORATORY USE ONLY	Y/N
PCKG REC'D/CUSTODY SEALS INTACT	
SAMPLE LABELS/COCs AGREE	
TEMPERATURE AT TIME OF RECEIPT ___ °C	

REMARKS

Charge # C80330T4

Project #

Required delivery time Overnight Delivery [X] 2 Day Delivery [ ] Air Bill No ________

COC # KH 445965 14 Day Turn Around

SAMPLERS (Signature) W. Sears 510963 / [signature] 510875 / [signature]

REPORT IDENTIFICATION NUMBER (RIN) 97A1780

LAB/LOCATION Thermo-Nutech - NORCAL

RFETS CONTRACTOR RMRS

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE CHAIN OF CUSTODY

DATE	TIME	EVENT	BOTTLE	USER ID	LOCATION	CONTAINER	MATRIX	Cooled to 4 C	NaOH	HNO3	H2 SO4	HCl	Isotopic Pu, Am, U	Isotopic Thorium
5/28/97	0945	001	002	DB00038RM	D87122	125 ml glass	GAC						X	X

5/28/97

Relinquished By	Received By/Organization	Date	Time
[signature] 5/28/97 1100	[signature]	5/28/97	1000

LABORATORY USE ONLY	Y/N
PCKG REC D/CUSTODY SEALS INTACT	
SAMPLE LABELS/COCs AGREE	
TEMPERATURE AT TIME OF RECEIPT ___ °C	

REMARKS

Charge # CB0330T4

Project #

Delivery time Overnight Delivery [X] 2 Day Delivery [ ] Air Bill No ____

COC # RFM 900450

3 Day turn-around

SAMPLERS (Signature) [signature] 510963 / [signature] 510815 / [signature]

REPORT IDENTIFICATION NUMBER (RIN) 97A1780

LAB/LOCATION Southwest Research LAB

RFETS CONTRACTOR RMRS

ROCKY FLATS
ENVIRONMENTAL TECHNOLOGY SITE
CHAIN OF CUSTODY

DATE	TIME	EVENT	BOTTLE	USER ID	LOCATION	CONTAINER	MATRIX	Preservation: Cooled to 4 C	Preservation: NaOH	Preservation: HNO3	Preservation: H2 SO4	Preservation: HCl	Analytes: Total Sulfur
5/28/97	0945	001	003	DB00038RM	D87122	125 ml g	GAC	X					X
5/28/97	1015	002	001	DB00039RM	D87309	125 ml g	GAC	X					X

5/28/97

Relinquished By	Received By/Organization	Date	Time
[signature] 5/28/97 1100	[signature]	5/28/97	1100

LABORATORY USE ONLY	Y/N
PCKG REC D/CUSTODY SEALS INTACT	
SAMPLE LABELS/COCs AGREE	
TEMPERATURE AT TIME OF RECEIPT ___ C	

REMARKS

Charge # CB0330T4

Project #

Required delivery time Overnight Delivery [X] 2 Day Delivery [ ] Air Bill No _____

APO COC DRAFT 5/15/97

RMRS Rocky Mountain Remediation Services, L.L.C
protecting the environment

INTEROFFICE MEMORANDUM

DATE February 20, 1997

TO M K Pepping, Operations, T893B, X3075

FROM JRC J R Cinillo, Water Treatment and Management, T891B, X5876

SUBJECT CHARACTERIZATION OF SPENT GRANULAR ACTIVATED CARBON AND ION EXCHANGE RESIN - JRC-006-97

Action Ensure proper characterization

Recently five drums of Ion Exchange (IX) resin and 20 drums of Granular Activated Carbon (GAC) were generated under the treatment activities at the Building 891 treatment facility A review of these wastes is necessary to ensure proper characterization, handling, storage, and disposal Both standard analysis and TCLP sampling were performed for anticipated constituents

Samples were taken for radioactive constituents on both the ion exchange and granular activated carbon The carbon exhibited low levels of radioactive elements above "background" levels and qualifies as a low level waste per radiological engineering written guidance The ion exchange resin is designed to remove uranium contamination which was confirmed with sample results of ~500 pci/g total uranium This waste also qualifies as a low level waste.

Both the ion exchange resin and the granular activated carbon were used to treat F-listed , contained-in wastes Therefore, the carbon and IX resin would also be considered hazardous waste unless a reasonable argument could be presented that all of the F-listed constituents had been removed prior to contact with the IX treatment media In this case, this type of positive proof can not be established and the wastes will therefore remain listed hazardous wastes

The results that were received on the ion exchange resin indicate that it meets LDRs, i e , it is not prohibited from land disposal However, the granular activated carbon analysis indicates that the waste does not meet the land disposal treatment standard of 6 0 ppm for tetrachloroethene The result of 24 ppm tetrachloroethene is well above the standard. Therefore, the granular activated carbon is subject to the prohibition on land disposal and will either have to be treated before disposal or handled in an alternative fashion (i e , regeneration, incineration etc)

Please feel free to contact me if you have any questions

JRC slm

cc
J E Law
J P Schmuck
A M Tyson
RMRS Records

Post-it® Fax Note 7671 | Date | # of pages ▶
To Hop Solomon | From J. Cinillo
Co./Dept | Co
Phone # | Phone #
Fax # 4046 | Fax #

12/09/96 DA Barnes, WJ Tosdino, DW Russell sampled VIRGIN
late entry GAC Grab sample 1320hrs FT20603RG
entered by Black Carbon RFP943274 Fed-X to HOLD
LB 1/8/96 CK200000 97L2039 CBogart
1/28/97 Reviewed by Russ Cirillo JRC
1/28/97CB CBogart Sampling spent GAC out of drums
D87303 FT20604RG RS9 1645hrs Grab
0-6" RFP902817 to QDEN 1/29/97
97L0242 CK200000 3 x 8oz glass
pH, Reactivity, TCLP VOA + metals Rush.
2wk TA per R. Cirillo. Samples were
chilled w/Blue ice for delivery. Attempt
was made to sample around the Radsorb
in the drum Sampled w/stainless
spoon Everything cleared out by DABarnes
CBogart
2/11/97 CBogart + MD Schreckengast sampling paint
in T900C trailer. Gray paint from
angle iron T900C-97-02-11-64-01 Yellow
paint from angle iron T900C-97-02-11-64-02
both attached to floor of trailer
PO. CB034000 to Schultz Lab via ASI
IH COC 97J1234 RUSH 3day TA
Grey paint for Pb, Cd, Cr Yellow for Pb, Cd, Cr, As
CBogart
02/25/97CB CBogart + BT Whilden sampling GW2 Remotes
Samples were taken w/stainless beaker
Bottles were prepreserved & pH's confirmed - except
VOA's Samples were chilled w/blue ice &
delivered to the T891C lab refrigerator. pH/cond/temp
were performed @ T891C lab. CK 20000 97L0244
GenChem. RFP902818 hand carry to QDEN
Rads RFP943279 FedX to Thermo-NuTech (GMAN)

Sample	Location	time	°C	pH	Cond uS/cm	Comments
FT20605RG	GW059	1020	21.0	6.5	882	
FT20606RG	GW061	1100	21.0	6.27	1415	

97L0242

CONTRACTOR [illegible] SAMPLERS [illegible] ANALYTICAL CHARGE # CK200000

SITE CONTACT/PHONE [illegible] FAX EXT 6783 LAB/LOCATION QDEN

COC NUMBER RFP [illegible]

EG&G ROCKY FLATS CHAIN OF CUSTODY

General Chemistry

DATE	TIME	SAMPLE NUMBER	LOCATION CODE	CONTAINER TYPE/SIZE/UNITS	NUMBER OF CONTAINERS	MEDIA S=SOIL W=WATER	F=FILTERED U=UNFILTERED	R=TURN AROUND RUSH	OUT OF SPEC REPORTS	COOLED TO 4 C	NAOH	HNO3	H2SO4	HCl
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	R		X				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	S	U	R		X				

BOTTLE CODES	V	V	B	P	M	M	W	W	W	W	W
		C					A	B	B	G	D
PRESERVATIVE		C					A	C	A		A
Analysis	VOA - CLP	VOA - 524.2 com.	BNA - CLP	PCBs/PEST. CLP	TOTAL Metals-CLP+(1)	DISS. Metals-CLP+(1)	WATER QUALITY (2)	NO3/NO2 as N	NH3	OIL & GREASE	Ortho-Phosphate
Row 1											
Row 2											

BOTTLE CODES	W	W	W	W	W	W	W	S	S
	E	G	H	L	J	K	G	F	F
PRESERVATIVE						A	C	A	D
Analysis	CYANIDE	COD	TOC	BOD pH	H2S	Cr VI	Reactivity	TCLP VOA	TCLP Metals
Row 1				X			X	X	X
Row 2				X			X		X

[illegible] 1/28/97

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME	
[illegible]	[illegible]	[illegible]	1-27-97	0800
[illegible]	[illegible]	[illegible]	1/29	1300
[illegible]	[illegible]	[illegible]	1/29	1355

LABORATORY USE ONLY	Y	N
PCKG REC'D/CUSTODY SEALS INTACT		
SAMPLE LABELS/COCs AGREE		
TEMPERATURE WITHIN SPECIFICATION ____C		
CORRECTED COPY ATTACHED		
PROBLEMS OR DISCREPANCIES		

REMARKS (1) INCLUDES Ca, Li, Sr, Mo, Si, Sn
(2) TSS, TDS, Cl, F, SO4, CO3, HCO3

SHIPMENT METHOD Fed X Hand Carry 1/27/97

AIRBILL NO.

Ship WHITE and YELLOW copies with samples – Retain GREEN field copy
Deliver BLUE copy to RFEDS with Datacap Transmittal f

Form EGGRFP-081393-GWCOCGC-V1

RUSH - Fax Results to [illegible] x6783 + R Cirillo x8025

97L0242

CONTRACTOR RTG **SAMPLERS** CBorert **ANALYTICAL CHARGE #** CK200000

SITE CONTACT/PHONE CBorert **FAX Ex** 6783 **LAB/LOCATION** ODEN

COC NUMBER RFP [illegible]

EG&G ROCKY FLATS CHAIN OF CUSTODY
General Chemistry

DATE/TIME	SAMPLE NUMBER	LOCATION CODE	CONTAINER TYPE SIZE UNITS	NUMBER OF CONTAINERS	MEDIA: S=SOIL W=WATER	F=FILTERED U=UNFILTERED	R=TURN AROUND RUSH	OUT OF SPEC REPORTS	COOLED TO 4 C	NAOH	HNO3	H2SO4	HCl	VOA - CLP	VOA - 524 2 com.	BNA - CLP	PCBs/PEST (CLP)	TOTAL Metals-CLP (1)	DISS. Metals-CLP (1)	WATER QUALITY (2)	NO3/NO2 as N	NH3	OIL & GREASE	Ortho-Phosphate	CYANIDE	COD	TOC	pH	H2S	Cr VI	Reactivity	TCLP VOAs	TCLP Metals
BOTTLE CODES														V	V	B	P	M	M	W	W	W	W	W	W	W	W	W	W	W	S	S	S
[illegible] 1015	ET20604 RG	B59	8oz G	3	S	U	R		X																			X			X	X	X
[illegible] 1015	ET10510 R[illegible]	[illegible]	8oz G	2	S	U	R		X																			X			X		X

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
[signature]	1/29/97 0820	[signature]	1/[illegible] 0820
			CB 1/27/97

REMARKS (1) INCLUDES Cs,Li,Sr,Mo,Si,Sn
(2) TSS,TDS,Cl,F,SO4,CO3,HCO3 ✓

SHIPMENT METHOD ~~Fed X~~ Hand Carry

AIR BILL NO

LABORATORY USE ONLY	Y	N
PCKG REC'D/CUSTODY SEALS INTACT		
SAMPLE LABELS/COCs AGREE		
TEMPERATURE WITHIN SPECIFICATION ______C		
CORRECTED COPY ATTACHED		
PROBLEMS OR DISCREPANCIES		

Ship WHITE and YELLOW copies with samples -- Retain GREEN field copy
Deliver BLUE copy to RFEDS with Datacap Transmittal

Form EGGRFP-081393-GWCOCGC-v1 1

RUSH TA Fax Results to C Borert x6783 - R[illegible] x8125

Attachment 4

Assumptions Used for the Calculation of Volume, Mass and Rate of GAC Generation

ENGINEERING/SCIENTIFIC NOTE PAD

RMRS Rocky Mountain Remediation Services, L.L.C. protecting the environment

SUBJECT: GAC MASS/VOLUME CALCULATIONS

Sheet 1 of 1

Project No: GAC Disposal

Client: DOE-EFETS

Prepared By: Hapi Salomon

Reviewed By:

Date: 6/23/97

From T3/T4, Rycons Pkt. 891 (CWTF)

Inventory: 7, full waste crates (4'x4'x7')
30, 55 gal drums

Mike Pepping (Generator) notes to Hapi Salomon on 6/23/97 that the waste crates are approximately 75% full and the drums are ~ 35% full

$7 \times 4' \times 4' \times 7' \times 0.75 = 588\ ft^3$

$30 \times 55\ gal \times \frac{ft^3}{7.48\ gal} \times 0.85 = 187.5\ ft^3$

$+$

$775.5\ ft^3$ ← Assume 775 ft^3/yr

Bulk density's given from MSDS are 0.25 – 0.6 g/cc

Per Scott Roesners suggestion on 6/18/97 (meeting @ INEEL) suggest using 0.5 g/cc average bulk density.

Therefore MASS

$775.5\ ft^3 \times \frac{0.5\ g}{cm^3} \times \frac{2.54\ cm}{1\ in} \times 2.54 \times 2.54 \times \frac{12\ in}{ft} \times 12 \times 12 =$

$10979857\ grams = 10980\ Kg$

$10980\ Kg \times \frac{2.2\ lbs}{1\ Kg} = 24156\ lbs$ ←

Attachment 5

Calculation of Maximum Chlorine (Halogen) Concentration

T-3/T-4 Spent GAC Chlorine Calculation from VOA sample DB00015RMDL						
					sample con	Cl concent
compound	formula	molecular wg	mol wgt Cl	% chlorine	(mg/kg)	(mg/kg)
chloroform	CHCl3	119 4	106 35	89 1	76	67 7
carbon tetracchloride	CCl4	153 8	141 6	92 1	160	147 3
trichloroethylene	C2HCl3	131 4	106 35	80 9	2,100	1,699 7
perchloroethylene	C2Cl4	165 8	141 6	85 4	7,400	6,319 9
trichloroethane	C2H3Cl3	133 4	106 35	79 7	120	95 7
1,2-dichloropropane	C3H6Cl2	113	70 2	62 1	240	149 1
					tot Cl conc	8,479 3
					%Cl	0 9

The GAC from T3/T4 and Ryan's Pit Source removals should contain Chlorine from only one source, the chlorinated VOCs that were adsorbed on it as part of the polishing efforts in the thermal desorption treatment process

Chlorine concentration was calculated from total VOA data (sample # DB00015RM-DL) This sample represented what was assumed to be the highest VOC containing GAC (GAC that was in the system the longest (the entire treatment operation)).

This data may assist if the GAC is to be incinerated

Signed
Hopi Salomon
Hopi Salomon 10/25/96

Attachment 6

MSDSs for Granulated Activated Carbon and Radsorb

GAC used for T3/T4 GAC + Ryans PIT

TIGG 5C AND 5D SERIES ADSORBENTS

MATERIAL SAFETY DATA SHEET

NOTE. May cover other activated carbons as listed 8x30

SECTION 1
SUPPLIER S NAME. TIGG CORPORATION
EMERGENCY TELEPHONE. 412-563-4300
ADDRESS P O BOX 11661, PITTSBURGH, PA 15228
CHEMICAL NAME AND SYNONYMS ACTIVATED CARBON
FORMULA. C

SECTION 2 HAZARDOUS INGREDIENTS
CARBON (ACTIVATED CARBON)
CAS#. 7440-44-0
% BY WEIGHT 100%
ORAL LD_{50} >10g/Kg (RAT)
TLV
ACGIH. N/A
OSHA. N/A
OTHER: N/A

CAUTION! WET ACTIVATED CARBON REMOVES OXYGEN FROM AIR CAUSING A SEVERE HAZARD TO WORKERS INSIDE CARBON VESSELS AND ENCLOSED OR CONFINED SPACES BEFORE ENTERING SUCH AN AREA, SAMPLING AND WORK PROCEDURES FOR LOW OXYGEN LEVELS SHOULD BE TAKEN TO ENSURE AMPLE OXYGEN AVAILABILITY, OBSERVING ALL LOCAL, STATE, AND FEDERAL REGULATIONS

SECTION 3 PHYSICAL DATA
BOILING POINT (°F)· N/A
VAPOR PRESSURE (mmHg) N/A
VAPOR DENSITY (AIR = 1) N/A
SOLUBILITY IN WATER: INSOLUBLE
SPECIFIC GRAVITY (H_2O = 1) 1.8-2.1
PERCENT VOLATILE BY VOLUME (%)· 0
pH. 5 0-8.0
PACKING DENSITY 0 4-0.5 g/cc
APPEARANCE AND ODOR: BLACK PARTICULATE SOLID

SECTION 4 FIRE AND EXPLOSION HAZARD DATA
FLASH POINT· 400 °C ASTM (DRY VIRGIN STATE)
FLAMMABLE LIMITS.
LEL N/A
UEL: N/A
EXTINGUISHING MEDIA. FLOOD WITH WATER. IF WATER IS UNAVAILABLE, NITROGEN OR FOAM MAY BE USED TO BLANKET THE ADSORBENT BED IF THE MATERIAL IS IN A CLOSED VESSEL, A BOTTOM INLET MAY BE BLOCKED TO DEPRIVE THE FIRE OF OXYGEN, BUT THE VESSEL SHOULD REMAIN VENTED FOR RELEASING STEAM OR OTHER HOT GASES.
SPECIAL FIRE FIGHTING PROCEDURES WEAR PROTECTIVE CLOTHING, SELF CONTAINED BREATHING APPARATUS IF NECESSARY
UNUSUAL FIRE AND EXPLOSION HAZARDS FLOODING THE VESSEL WITH WATER WILL EXTINGUISH ANY HOT ZONES. COPIOUS VOLUMES OF STEAM MAY BE GENERATED IN THE PROCESS OF EXTINGUISHING THE HOT ZONES. STEAM GENERATION IS REDUCED WHEN FLOODING OCCURS FROM THE BOTTOM UP, AS OPPOSED TO A SPRAY FROM ABOVE. THE CARBON ITSELF MAY NOT EXHIBIT FLAMING ALTHOUGH ANY COMBUSITBLE MATERIAL IN CONTACT WITH IT WILL. AT TEMPERATURES AROUND 900 °C, CARBON CAN REACT WITH FIRE-FIGHTING MATERIALS SUCH AS WATER OR CARBON DIOXIDE TO FORM HYDROGEN AND/OR CARBON MONOXIDE WHICH COULD REACH LEVELS HAZARDOUS TO RESPIRATION OR REPRESENTING A COMBUSTIBLE OFF-GAS

SECTION 5 HEALTH HAZARD DATA
EFFECT OF OVER EXPOSURE
A. ACUTE
1. INGESTION
THE PRODUCT IS NON TOXIC THROUGH INGESTION THE ACUTE ORAL LD_{50} (RAT) IS >10g/Kg
2. INHALATION
THE ACUTE INHALATION LC_{50} (RAT) IS >64 4 MG/L (NOMINAL CONCENTRATION) FOR ACTIVATED CARBON

TIGG CORPORATION
BOX 11661
PITTSBURGH, PA 15228

TELEPHONE (412) 563-4300
TELEX 269312 (RCA)
FAX 412-563-6155
CABLE TIGGCOR PITTSBURGH

GAC used for Building 891

MATERIAL SAFETY DATA SHEET

SECTION I

		Product Name.	ACTIVATED CARBON, *CC SERIES, KG SERIES, KP SERIES*
Manufacturer	WESTATES CARBON, INC.	MSDS Number*	100
	2130 Leo Avenue	CAS Number*	CAS 7440-44-0
	Los Angeles, California 90040-1634	Date Prepared.	NOVEMBER 28, 1993
Phone Number (For Information)	(213) 722-7500	Prepared By*.	MARGARET JEFFERSON
Emergency Phone Number	(800) 659-1771	Note	Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

SECTION II - MATERIAL IDENTIFICATION AND INFORMATION

COMPONENTS - Chemical Name & Common Names (Hazardous Components 1% or greater; Carcinogens 0 1% or greater)	%*	OSHA PEL	ACGIH TLV	OTHER LIMITS RECOMMENDED
ACTIVATED CARBON	100%	2.5 mg/m³	1.5 mg/m³	NONE
NON-HAZARDOUS INGREDIENTS				
TOTAL	100			

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT	not applicable	SPECIFIC GRAVITY (H_2O = 1)	0.25 - 0.60 g/cc
VAPOR PRESSURE (mm HG AND TEMPERATURE)	zero	MELTING POINT	not applicable
VAPOR DENSITY (AIR = 1)	not applicable	EVAPORATION RATE (_____ = 1)	not applicable
SOLUBILITY IN WATER	Insoluble in water and solvents	WATER REACTIVE	non-reactive
APPEARANCE AND ODOR	Black granules without taste or odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT AND METHOD USED N/A	Auto-Ignition Temperature	> 450°C ANSI/ASTM D 3468	Flammability Limits in Air % by Volume N/A	LEL N/A / UEL N/A

EXTINGUISHER MEDIA: Water (fog or fine spray), carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES: Avoid procedures that may stir up dust clouds

UNUSUAL FIRE AND EXPLOSION HAZARDS: Avoid contact with strong oxidizers, airborne dust may be a weak explosion hazard.

* OPTIONAL

SECTION V - REACTIVITY HAZARD DATA

STABILITY ■ Stable □ Unstable	CONDITIONS TO AVOID **Contact with strong oxidizers**
INCOMPATIBILITY (MATERIALS TO AVOID) **Strong oxidizing agents**	HAZARDOUS DECOMPOSITION PRODUCTS. **Carbon Dioxide Carbon Monoxide**
HAZARDOUS POLYMERIZATION □ May Occur ■ Will Not Occur	CONDITIONS TO AVOID **not applicable**

SECTION VI - HEALTH HAZARD DATA

PRIMARY ROUTES ■ Inhalation □ Ingestion CARCINOGEN LISTED IN □ NTP □ OSSA □ IARC Monograph ■ Not Listed

HEALTH HAZARDS LD50 VALUES not available ACUTE not available CHRONIC No effects from chronic exposure are known

EMERGENCY FIRST AID PROCEDURES Seek medical assistance for further treatment, observation and support, if necessary

EYE CONTACT **Immediately flush with copious amounts of water If redness, itching or a burning sensation develops, have eyes examined and treated by medical personnel.**

SKIN CONTACT **Wash material off the skin with soap and water If redness, itching or a burning sensation develops, get medical attention**

INHALATION **Remove victim to fresh air. If cough or other respiratory symptoms develop, consult medical personnel.**

INGESTION **Give one or two glasses of water to drink. If gastrointestinal symptoms develop, consult medical personnel (Never give anything by mouth to an unconscious person).**

SECTION VII CONTROL AND PROTECTIVE MEASURES

RESPIRATORY PROTECTION (SPECIFY TYPE) Use MSA-NIOSH approved respirator for respirable dusts, mists and fumes

PROTECTIVE GLOVES Rubber latex

EYE PROTECTION Safety glasses with side shields Contact lenses should not be worn when working with carbon

VENTILATION TO BE USED. ■ Local Exhaust □ Mechanical (general) □ Special □ Other (specify)

OTHER PROTECTIVE CLOTHING AND EQUIPMENT NONE

HYGIENIC WORK PRACTICES **Wash contacted skin areas after handling**

SECTION VIII - PRECAUTIONS FOR SAFE HANDLING AND USE/LEAK PROCEDURES

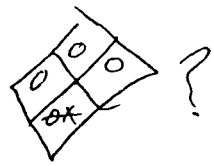
STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED **Wear respiratory protection during clean up Sweep up and recover or mix material with moist absorbent for dust control and pick-up and shovel into waste container Use detergent in spill area after clean up and flush with plenty of water**

WASTE DISPOSAL METHODS **Dispose of virgin (unused) carbon (waste or spillage) per local regulations**

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE *Activated carbon can be safely stored in any normal storage area, but away from direct heat*

OTHER PRECAUTIONS AND OR SPECIAL HAZARDS **An oxygen deficiency may be created when activated carbon is stored in an enclosed space/silo Ventilate or wear self-contained breathing apparatus. Follow all procedures for confined space entry**

NFPA Rating* Health 1 Flammability 1 Reactivity 0	HMIS Rating* Health 1 Flammability 1 Reactivity 0 Special □



MATERIAL SAFETY DATA SHEET

RADSORB

SECTION 1 - IDENTIFICATION

MANUFACTURER'S NAME	ENVIRONMENTAL SCIENTIFIC, INC
ADDRESS	5400 SOUTH MIAMI BLVD MORRISVILLE, NC 27560
EMERGENCY PHONE NUMBER	FOR TRANSPORTATION EMERGENCY Call 919-941-0847 Ingestion or skin contact call ENVIRONMENTAL SCIENTIFIC 919/941-0847
PHONE NUMBER	919-941-0847
EFFECTIVE DATE	3-30-94
CHEMICAL FAMILY	Polyacrylate/polyacrylamide, crosslinked
TRADE NAME	RADSORB
DOT CLASSIFICATION	Not applicable
DOT HAZARD CLASS	Not applicable

SECTION 2 - HAZARDOUS INGREDIENTS

HAZARDOUS COMPONENTS	HAZARDOUS %	TLV (Units)
one	0 0%	None

SECTION 3 - PHYSICAL DATA

VOLATILITY (%)	None
SOLUBILITY IN WATER	Insoluble, but swellable in aqueous fluids
pH VALUE	6 5+/-1 0
PHYSICAL FORM	Granular solid
PARTICLE SIZE	200+/-100 μ
MOISTURE CONTENT	<5%
BULK DENSITY	40+/-5 lbs/ft^3

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	Not applicable
EXTINGUISH MEDIA	Water, CO_2, foam, dry powder
UNUSUAL FIRE AND FIRE HAZARD	None

SECTION 5 - HEALTH EFFECTS INFORMATION

SKIN CONTACT	Prolonged contact may cause slight irritation due to the somewhat abrasive powder
EYE CONTACT	May cause slight irritation and swelling of mucous membrane
INHALATION	May cause irritation to the respiratory tract and lungs

FIRST AID	SKIN CONTACT Wash with soap and water EYE CONTACT Rinse with plenty of water for at least 15 minutes If discomfort continues seek medical attention INHALATION Remove to fresh air If discomfort continues, seek medical attention INGESTION If discomfort continues seek medical attention

SECTION 6 - REACTIVITY INFORMATION

STABILITY	Stable
INCOMPATIBILITY	Strong oxidants e g sodium hypochlorite alkalies and acids
HAZARDOUS POLYMERIZATION	Will not occur
CONDITIONS TO AVOID	Keep from getting damp or wet until ready to use
THERMAL DECOMPOSITION PRODUCTS	In the event of combustion CO, CO_2, NOx may be formed Do not breathe smoke or fumes, Wear suitable protective equipment

SECTION 7 - PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION	Not required under normal use conditions If significant dusting occurs, wear NIOSH approved dust respirator
VENTILATION	If significant dusting occurs local exhaust ventilation is recommended
OTHER PROTECTION	No special precautions Avoid eye and skin contact and inhalation of dust

SECTION 8 - SPILL AND DISPOSAL

SPILL CONTROL AND RECOVERY

SOLID SPILLS	Sweep up and place in reclaim or disposal container Wear protective equipment specified in Section 7
DISPOSAL	Radsorb is not a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261 it does not have characteristics of Subpart C and it is not listed under Subpart D Radsorb is a non-hazardous solid waste and can be disposed of by incineration or in a sanitary landfill in accordance with local state and federal regulations

SECTION 9 - TRANSPORTATION INFORMATION

DOT SHIPPING NAME/HAZARD CODE	Radsorb is not regulated during transportation

SECTION 10 - REGULATORY INFORMATION

TOSCA	Radsorb does not contain ingredients (at a level of 1% or greater) on the List of Toxic Chemicals
FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401 15	Radsorb does not contain ingredients specifically listed
CLEAN AIR ACT, 40 CFR 60, SECTION 111 40 CFR 61, SECTION 112 Act.	Radsorb does not contain ingredients covered by the Clean Air
CALIFORNIA PROPOSITION 65	Radsorb does not contain chemicals on the current Proposition 65 list
MICHIGAN CRITICAL MATERIALS	Radsorb does not contain ingredients listed on the Michigan Critical Materials Register

SECTION 11 - USER'S RESPONSIBILITY

This Radsorb material safety data sheet provides health and safety information Radsorb is to be used in applications consistent with our product literature Individuals handling Radsorb should be informed of the recommended safety precautions and should have access to this information For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to ensure safe workplace operations Please consult your ESI sales representative for further information

SECTION 12 - STORAGE

STORAGE	Keep material in a dry location and sealed to minimize water absorption before use

Attachment 7

RFETS Waste Packaging Variance Request and Industrial Hygiene VOC Monitoring Results

RADIOACTIVE WASTE VARIANCE REQUEST

RWVR No. 96-04

Section 1 (To be completed by the Initiator)

Initiator Name	Employee Number	Building	Department	Phone/Page	Date
Hopi Salomon	NA	T893B	Accelerated Actions	6627/5129	9/13/96

Description of Variance (include specific requirements for which variance is being requested)

Package granulated activated carbon (gac) which has been used on the T3/T4 project and is now spent. The waste contains D coded organics, some F-Listed components (from Ryan's Pit remediation) and small amounts (~60 pCi/g) U^{238}. We request that the waste be able to be packaged in 4'x4'x7' wooden waste crates for which we need a variance from ~~W.O-11-01~~ to WO-1101. (which requires white 55 gal drums).

Justification for Variance (describe why variance is being requested and any action to be taken):

Per. Joe Molter, (RWRS) Doug Parker (Dyncorp Traffic), Ken Lenarcek (Dyncorp traffic) these 4'x4'x7' waste crates are appropriate shipping containers for spent GAC. Also, these containers take up less space when being stored, and are more appropriate than drums for bulk storage.

Scope of Variance (describe the extent to which the variance is applicable - i.e., time frame, affected drum numbers).

The spent GAC has already been loaded, but will not be sealed up until this variance is approved. The waste is currently in the following waste crates: P02172, P02173, P02174, P02175 ~~P0212, P0213, P0214, P0215~~, P02176, P02243, P02245; and the following drums.

D87118, D87113, D87117, D87119, D87121, D97122, D87126, D87128, D87130, D87132

The waste crates will be evaluated for VOA emissions after they are sealed in accordance with 40 CFR 60 Appendix A, Method 21, "Determination of Volatile Organic compound leaks". This waste is expected to be incinerated at INEL WERF or Oak Ridge incinerator

After completion of Section 1, submit form to Radioactive Waste Programs, Building T130C.

Section 2

Variance Disposition (circle one)

(Approve) **Reject**

Approvals

[signature] Radioactive Waste Programs

[signature] Waste Certification Programs

Comments

Place copy of this variance with W/RT documentation for all affected containers/packages fgV

Survey of Waste Crates 9-23 96 ~~13~~ mos 1530. Peggy Schreckengast, Health + Safety Supervisor, T3/T4 Project

Instrument - Photo ionization detector equipped with an 11.7 eV lamp, which will detect all suspect VOCs. It is calibrated with 100ppm isobutylene It detects down to 0.1 ppm.

Response factors for the compounds of concern (or 10 to 0's) range from 1/10 to 2x the reading

Instrument range is 0.1 - 2,000 ppm

Sample probe = 1/4 internal diameter.

Instrument response time is less than 30 seconds (approximately 10 seconds)

Instrument was calibrated this morning by Wade Russell, RTG On a 100ppm isobutylene standard, the instrument read 104 ppm

Survey performed in accordance with 40 CFR, Part 60., App A, Method 21

Waste Crates:	Reading
PO2172	0 ppm above background at all wood joints
PO2173	
PO2175	
PO2174	

4x4x7 Waste Crates - sealed, banded containing spent GAC with high VOC levels

9-24-96 Fred Kerchner monitored the following crates on 9-24-96. The same instrument was used, and was calibrated as detailed above

PO 2245

PO 2243

PO 2176

MD. Schreckengast